



Preventive Maintenance Manual

AX-201

PHILIPS

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Integrated electronics manufacturing solutions

Document	Preventive Maintenance Manual AX-201
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Preventive Maintenance Manual

This manual is a summary of all maintenance instructions from:

Service Manual AX-201
4022 593 50293 08.03

This manual can be used to maintain the machine.

More detailed information can be found in the service manual mentioned above.
Use of this manual for qualified and trained personnel only.

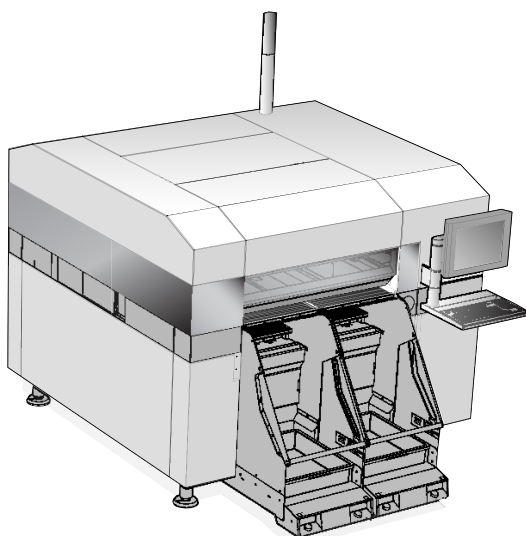


Figure 1 AX-201

The preventive maintenance schedule can be found: [A7.3 Preventive maintenance schedule](#)

This manual is:

- A summary of preventive maintenance instructions of the Service Manual, see [MODULE 1. MAINTENANCE INSTRUCTIONS](#)
- Additional instructions, see [MODULE 2. ADDITIONAL INSTRUCTIONS](#)

For maintaining the machine the following tools are recommended:

Item	Description	Reference
Maintenance kit	A collection of spare parts and materials that enables the customer to perform preventive maintenance, and also simple repairs that do not require specific knowledge or tools.	A8.5.3.Maintenance kit (PA 2440/00)
Recommended standard tools	Tools that are used for general purposes during service and maintenance activities. Local purchase by the customer is expected.	A8.6.3.Recommended standard tools

Figure 2 Recommended tools

CHAPTER A7 Maintenance schedules

This chapter lists all preventive maintenance aspects of the machine, completed with recommended intervals and references to the actual procedure.

A7.1 Recommended maintenance tools and materials

Recommended maintenance tools and materials can be found in:

- [A8.6 Tools](#)
- [A8.5 Materials](#)

A7.2 Maintenance intervals, calculation

All data on recommended maintenance intervals and total service time are based on following starting points:

- Production time 20 hours a day;
- Environmental operating conditions as specified in the Installation Manual (e.g. temperature, humidity, dust etc.);
- Full option configuration.

Keep in mind that a number of extra factors will affect actually needed maintenance intervals, e.g.

- Deviating environmental operating conditions;
- Component's quality;
- Tape material's quality;
- The use of glue/ solder paste;
- Oil contents of compressed air.

A7.3 Preventive maintenance schedule

Item		Operator		Engineer	
Base	Time	Weekly	Monthly	6 Months	Yearly
B7.1 Touch screen and keyboard, cleaning	2	✱	✱	✱	✱
B7.2 Protection hoods, cleaning	5	✱	✱	✱	✱
B7.3 Safety contacts on front and rear cover, checking	2	✱	✱	✱	✱
B7.4 Air supply unit, draining	5	-	✱	✱	✱
B7.5 Filter in controllers, replacement	2	-	-	✱	✱
B7.6 Filter in air supply unit, replacement	10	-	-	✱	✱
B7.7 Gauges on air supply unit, checking	2	-	-	-	✱
Board transport					
C7.1 Board sensors, cleaning	2	-	✱	✱	✱
C7.2 Transport area, cleaning	5	-	✱	✱	✱
C7.3 Transport spindles and bearings, checking and lubricating	30	-	-	✱	✱
C7.4 Transport belts, checking	10	-	-	✱	✱
Placement heads					
D7.1 Toolbit exchange unit, cleaning	2	-	✱	✱	✱
D7.2 Component reject module, cleaning	2	-	✱	✱	✱
D7.3 Nozzles interface, checking cleaning	10	-	✱	✱	✱
D7.4 Placement head DV, cleaning the air channel	15	-	-	-	✱
D7.5 Placement head HA, replacing the dust catch filter in flip chip nozzle	3 per nozzle	-	-	✱	✱
D7.6 Placement head HA, replacing the dust catch filter in nozzle	5 per nozzle	-	-	✱	✱
D7.7 Placement head HA, replacing the carbon brushes from Z and RZ motor	10	-	-	-	✱
D7.8 Placement head DV and Z-lift, checking, cleaning and lubricating	60	-	-	-	✱
D7.9 Placement head HA, checking, cleaning and lubricating	20	-	-	-	✱
Vision					
F7.1 CV camera, cleaning the external waste bin	2	✱	✱	✱	✱
F7.2 Vision markers on CV camera, cleaning	5	✱	✱	✱	✱
F7.3 BA camera, cleaning	2	-	✱	✱	✱
F7.4 CV camera, cleaning the glass plate	15	-	-	-	✱
F7.5 CV camera, cleaning the internal waste bin	2 or 20	-	-	✱	✱
XY robot					
G7.1 Linear scales on XY robot, cleaning	2	-	-	✱	✱
G7.2 Linear guides on XY robot, cleaning and lubricating	30	-	-	✱ ¹⁾	✱
G7.3 Fans on X axis, cleaning	20	-	-	✱	✱
G7.4 Fans on Y axis, cleaning	30	-	-	✱	✱

1) Lubricate the linear guides **every 2 months**.

MODULE 1. MAINTENANCE INSTRUCTIONS

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CHAPTER B7 Maintenance instructions



NOTE: Operation, adjustment, maintenance and repair of this machine shall be carried out by **qualified and trained** personnel only.

This chapter contains detailed (corrective and preventive) maintenance instructions.

The preventive maintenance intervals are defined in [A7.3 Preventive maintenance schedule](#) .

For Material Safety Data Sheets, see [A2.12 Material safety data sheets \(MSDS\)](#)

B7.1 Touch screen and keyboard, cleaning

Estimated time to complete [min.]: 2

Required special tools. Fibre free tissue, household glass cleaner

Required part(s) -

1. Prerequisites

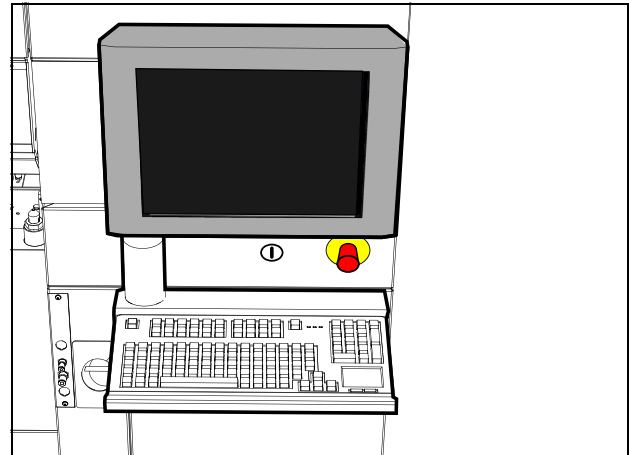
- Log out (preventing unwanted actions).

2. Cleaning the touch screen(s)

- Dampen fibre free tissue with household glass cleaner and clean the touch screen(s).

3. Cleaning the keyboard and pad

- Take the keyboard out of the holder and hold the keyboard upside down to remove dust.
- Dampen fibre free tissue with household glass cleaner and clean the keyboard and pad.



B7.2 Protection hoods, cleaning

Estimated time to complete [min.]:	5
Required special tools.	Vacuum cleaner, fibre free tissues, household glass cleaner
Required part(s)	-

1. Prerequisites

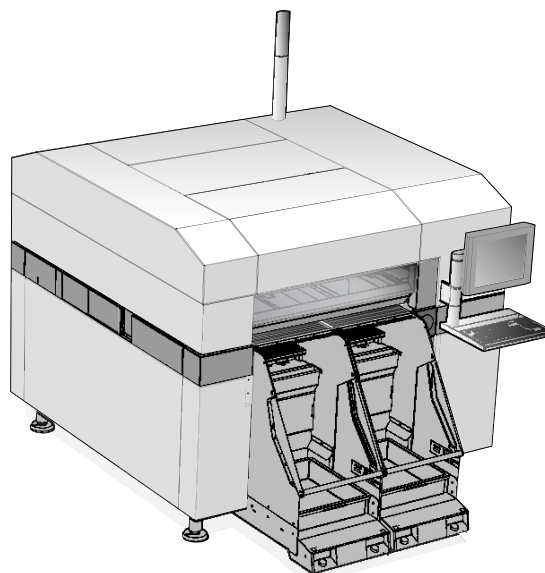
- Close hoods.
- Log out (preventing unwanted actions).
- Use a stepstool if necessary.

2. Cleaning the protection hoods

- Use a soft haired vacuum cleaner or hand broom to remove the dust.

Note: Do not use compressed air.

- Dampen fibre free tissue with household glass cleaner and clean the hoods.

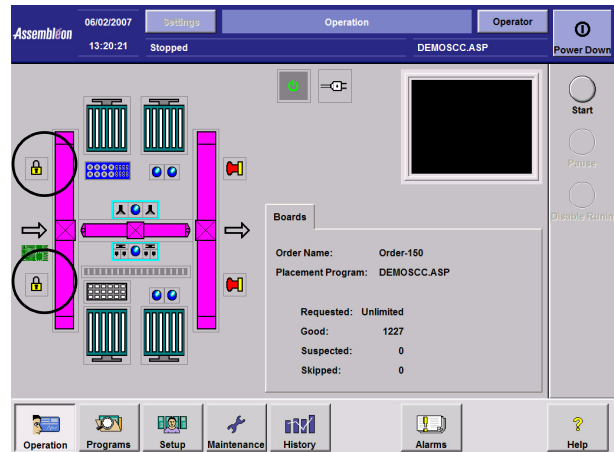


B7.3 Safety contacts on front and rear cover, checking

Estimated time to complete [min.]: 2
 Required special tools. -
 Required part(s) -

1. Check function of safety contacts

- Power up the machine.
- Operate the 'power on' push-button.
- Open a cover.
 The monitor shows the safety cover opened.
- Repeat the procedure for each safety cover.



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B7.4 Air supply unit, draining

Estimated time to complete [min.]: 5
Required special tools. -
Required part(s) -



DANGER OF STRONG MAGNETIC FIELD

Pacemaker and metal prosthetic users are at risk of serious injury or death. Stay away from the magnets.

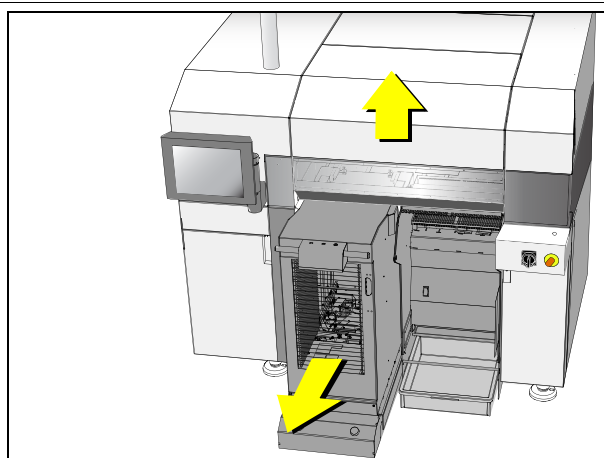


HIGH AIR PRESSURE

Uncontrolled release of air pressure may cause injury. Turn off and lock out system before servicing, see Safety chapter .

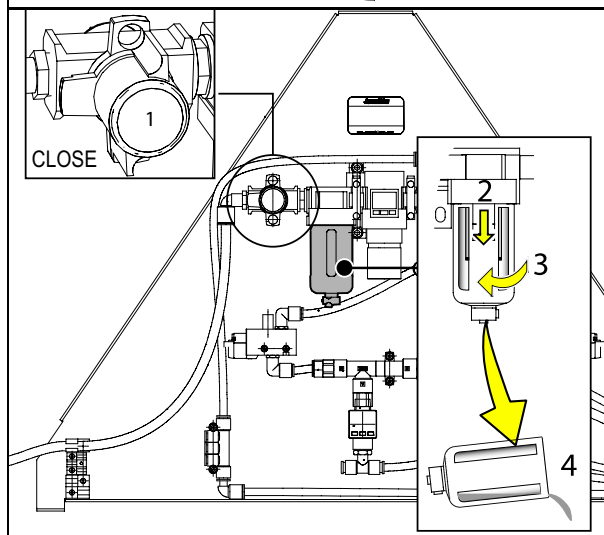
1. Prerequisites

- If present, remove the rear right trolley.
- Power down the machine.
- Open the rear cover.



2. Draining the filter

- Check and if necessary, drain the air filter.
- Close main valve (1).
- Press knob (2) down and remove the bowl (3).
- Drain and clean the bowl (4). Clean inside of the bowl (read cleaning instructions on the bowl surface).
- Place the bowl back with the knob in a 45° angle.
- Rotate bowl until the knob points towards you.
- Open the main valve (1).
- Check for air leakage.



3. Finalize

- Power up the machine.
- When removed, install the rear right trolley.

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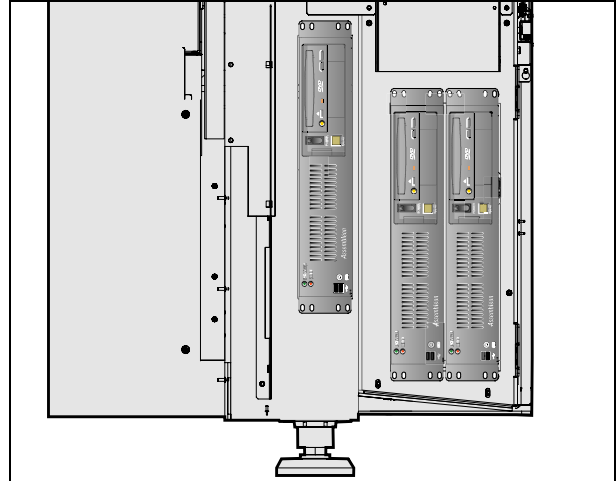
B7.5 Filter in controllers, replacement

Estimated time to complete [min.]:	2
Required special tools.	Vacuum cleaner
Required part(s)	Filters, see A8.4.1 Controllers, spares

1. Prerequisites

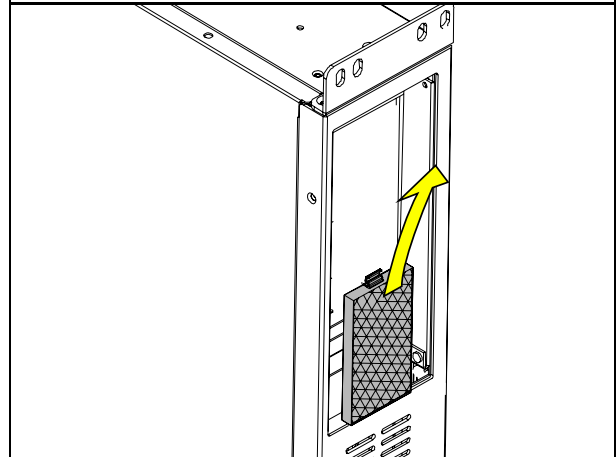
- Open the front door.

2. Clean the area with a vacuum cleaner



3. Replace the filter in the controllers

- Replace the filters by sliding a new filter inside the controller.



B7.6 Filter in air supply unit, replacement

Estimated time to complete [min.]: 10

Required special tools. -

Required part(s) Filter, see [A8.4.5 Air supply unit, spares](#)

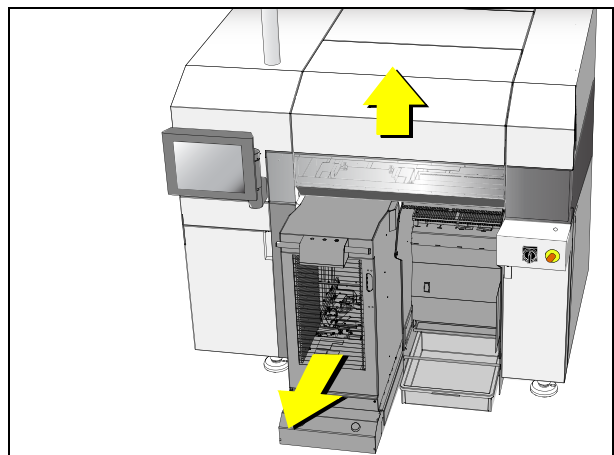


DANGER OF STRONG MAGNETIC FIELD

Pacemaker and metal prosthetic users are at risk of serious injury or death. Stay away from the magnets.

1. Prerequisites

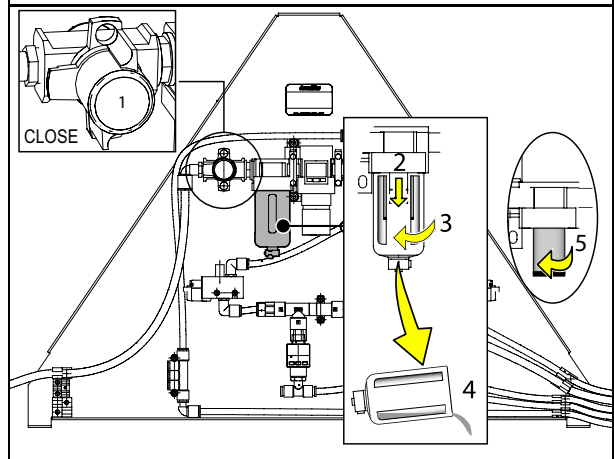
- If present, remove the rear right trolley.
- Power down the machine.
- Open the rear cover.



2. Remove air filter

WARNING: Be careful with metal objects close to the strong magnets of the XY robot.

- Close main valve (1). The remaining air pressure in the system is released.
- Press knob (2) down and remove the bowl (3).
- Drain and clean the bowl (4). Clean inside of the bowl (read cleaning instructions on the bowl surface).
- Remove filter element (5).



3. Install new air filter

- Place and tighten the new filter element (5).
- Place bowl (4) back with the knob in a 45° angle.
- Rotate bowl until the knob points towards you.
- Open main valve (1).
- Check for air leakage.

4. Finalize

- Power up the machine.
- When removed, install the rear right trolley.

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B7.7 Gauges on air supply unit, checking

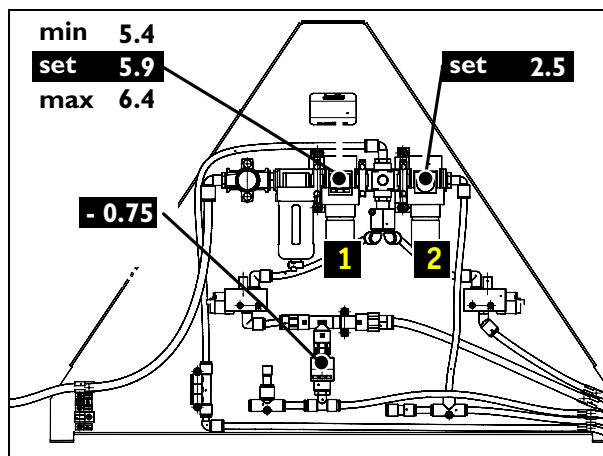
Estimated time to complete [min.]: 2

Required special tools.

Required part(s)

1. Check gauges on the air supply unit

- Check if both gauges show the correct values.
- Adjust the gauges (1,2) if necessary, see [B6.4 Digital pressure switch, check and adjust settings](#)



CHAPTER C7 Maintenance instructions



NOTE: Operation, adjustment, maintenance and repair of this machine shall be carried out by **qualified and trained** personnel only.

This chapter contains detailed (corrective and preventive) maintenance instructions.

The preventive maintenance intervals are defined in [A7.3 Preventive maintenance schedule](#) .

For Material Safety Data Sheets, see [A2.12 Material safety data sheets \(MSDS\)](#)

C7.1 Board sensors, cleaning

Estimated time to complete [min.]: 2

Required special tools. Ethanol, lense tissues

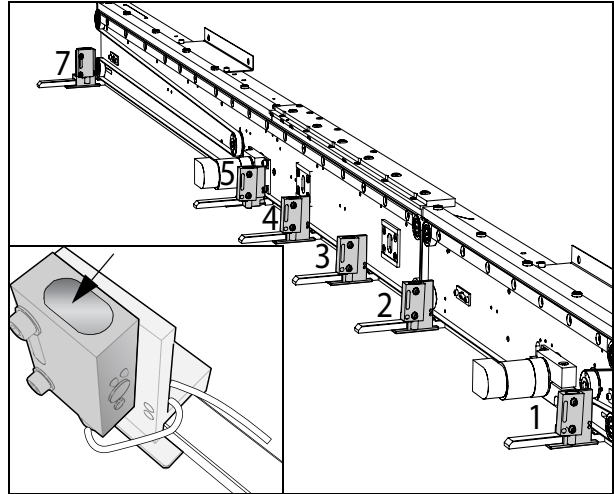
Required part(s) -

1. Prerequisites

- Remove the front trolleys.
- Power down the machine.

2. Cleaning the board sensors

- Clean the lenses of all board sensors using lense tissues.



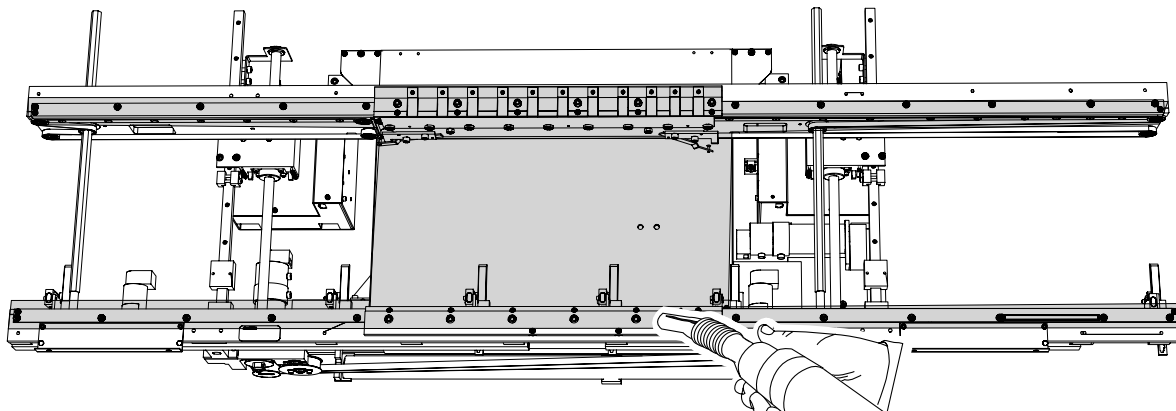
C7.2 Transport area, cleaning

Estimated time to complete [min.]: 5
Required special tools. Vacuum cleaner, fibre free tissues, ethanol
Required part(s) -

1. Prerequisites

- Remove the front trolleys.
- Power down the machine.

2. Cleaning



- Use a vacuum cleaner to remove components, rubbish and dust from the board transport area.
- Clean the transport track using fibre free tissue moistened with ethanol.

C7-00003.fm

C7.3 Transport spindles and bearings, checking and lubricating

Estimated time to complete [min.]: 30

Required special tools: -

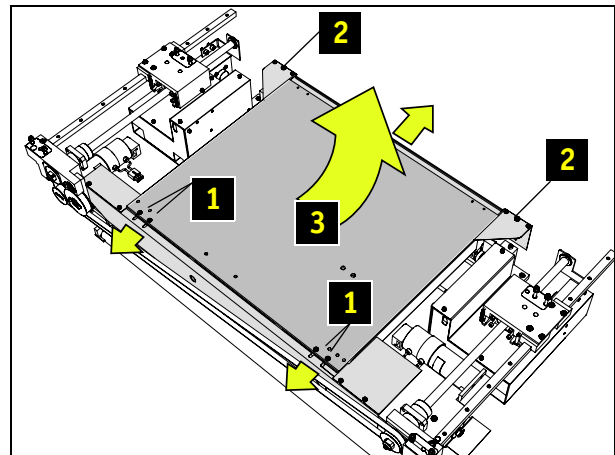
Required part(s) Grease, [A8.5.3 Maintenance kit \(PA 2440/00\)](#)

1. Prerequisites

- Set transport to minimum width.
- Set the lift table to the down position.
- Remove the front trolleys.
- Power down the machine.

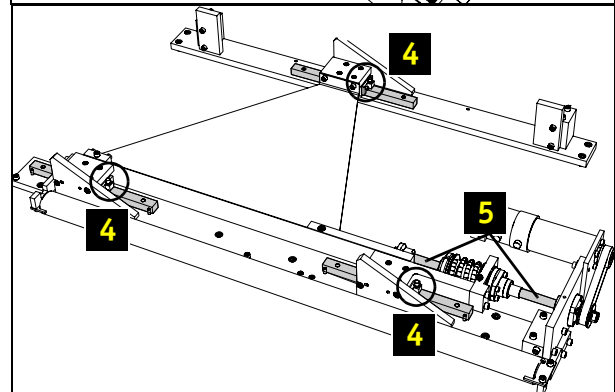
2. Remove lift table

- Loosen four screws at the front (1) and slide transport security plate to the front.
- Remove two screws (2) and take rear security plate out.
- Take out the lift table (3) by lifting it under an angle of approximately 45 degrees.



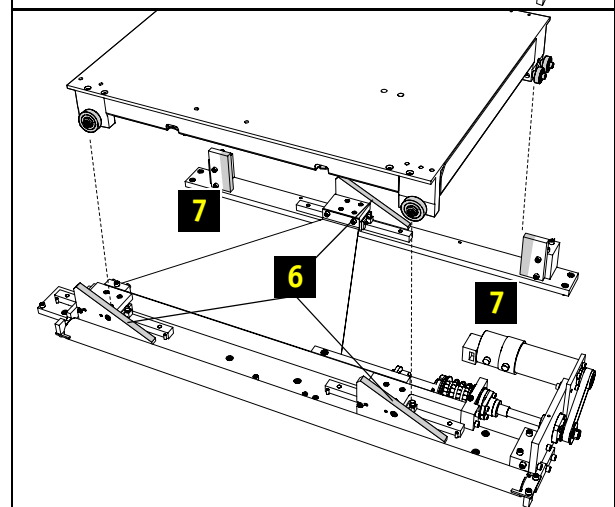
3. Lubricate the lift table

- Lubricate the linear guides (4) with Isoflex Topas NCA52.
- Grease the spindle (5) with NSK no.1



4. Check and grease the lift table

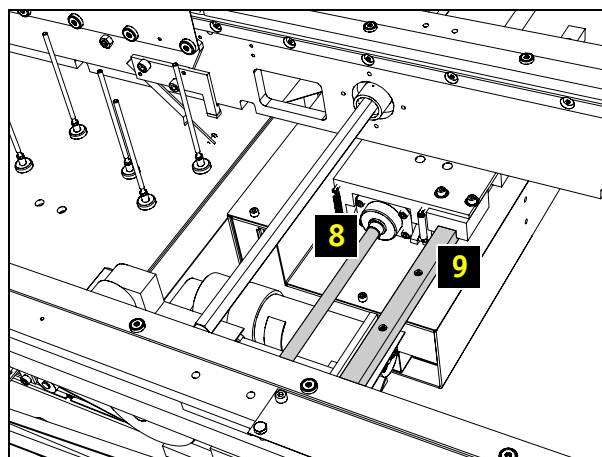
- Check the function of the bearings.
- Clean bearings, if necessary.
- Grease the cam blocks (6) and guides (7), use Anti score EP lube 3 grease.
- Install the lift table.



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5. Grease the board width adjustment

- Grease the spindles (8) left and right, use NSK no.1
- Grease the guides (9) left and right, use Isoflex Topas NCA52.



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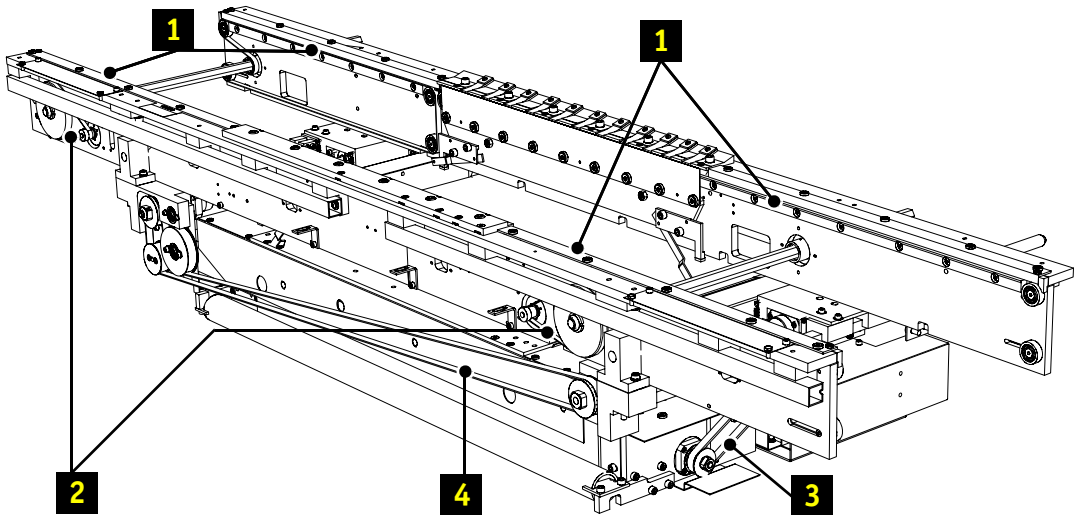
C7.4 Transport belts, checking

Estimated time to complete [min.]: 10
Required special tools. Belt tension indicator,
see [A8.6.6 Recommended Assembléon tools](#)
Required part(s) -

1. Prerequisites

- Remove the front trolleys.
- Power down the machine.

2. Checking the belts



- Check the transport belts for tension and damage, replace them where necessary.

Belt	Check belt tension	Replacement
1	C6.8. Transport belts, check/adjust tension	C8.3 Transport belts, replacement
2	C6.3. Transport drive belt, check/adjust tension	C8.2 Transport drive belts, replacement
3	C6.4. Transport lift belt, check/adjust tension	C8.7 Transport lift belt, replacement
4	C6.2. Transport width belt, check/adjust tension	C8.17 Transport width belt, replacement

Note: Check the bearings when replacing a belt.

C7-00005.fm

CHAPTER D7 Maintenance instructions



NOTE: Operation, adjustment, maintenance and repair of this machine shall be carried out by **qualified and trained** personnel only.

This chapter contains detailed (corrective and preventive) maintenance instructions.

The preventive maintenance intervals are defined in [A7.3 Preventive maintenance schedule](#) .

For Material Safety Data Sheets, see [A2.12 Material safety data sheets \(MSDS\)](#)

D7.1 Toolbit exchange unit, cleaning

Estimated time to complete [min.]: 2

Required special tools. Vacuum cleaner, fibre free tissues

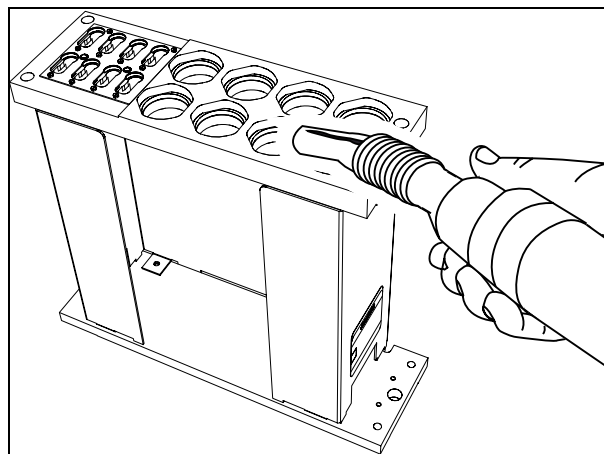
Required part(s) -

1. Prerequisites

- Clean the toolbit exchange unit from the back of the machine.

2. Cleaning the toolbit exchange unit

- Remove components, rubbish and dust with a vacuum cleaner.
- Clean the toolbit exchange unit with a fibre free tissue.



D7.2 Component reject module, cleaning

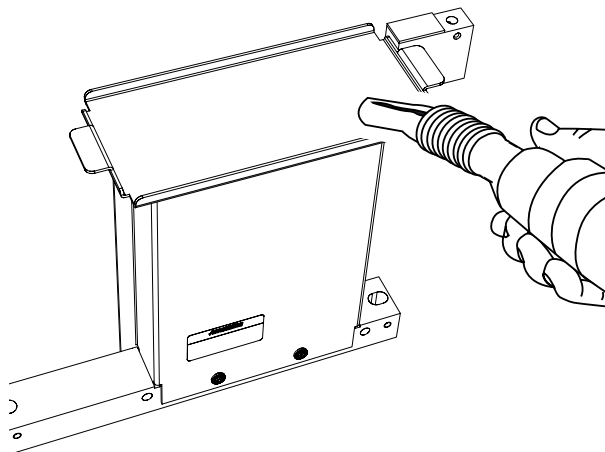
Estimated time to complete [min.]: 2
Required special tools. Vacuum cleaner, fibre free tissues
Required part(s)

1. Prerequisites

- Clean the toolbit exchange unit from the back of the machine.

2. Cleaning the reject module

- Remove components, rubbish and dust with a vacuum cleaner.
- Clean the reject module with a fibre free tissue.



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D7.3 Nozzles interface, checking cleaning

Estimated time to complete [min.]: 10

Required special tools. Ethanol, petroleum jelly

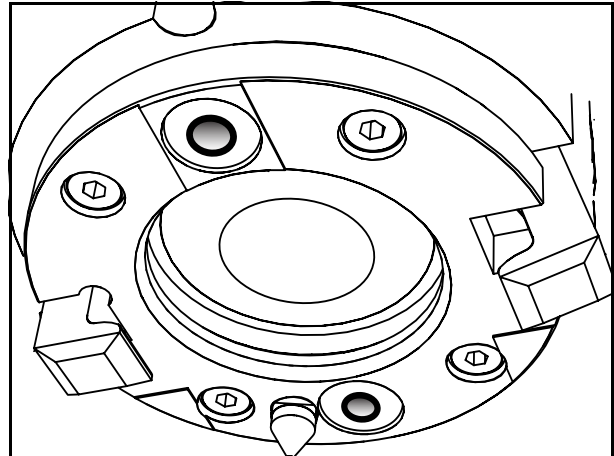
Required part(s) -

1. Prerequisites

- Remove toolbits fro placement heads.

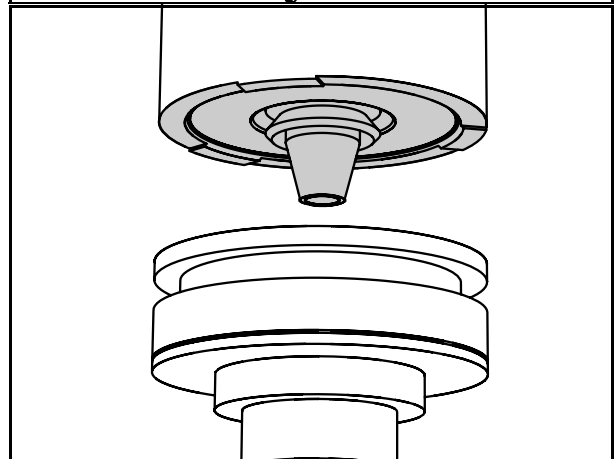
2. Cleaning and checking HA nozzle interface

- Clean with ethanol.
- Grease the two O-rings with petroleum jelly.



3. Cleaning and checking DV nozzle interface

- Clean with ethanol.
- Grease the O-rings with petroleum jelly.



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D7.4 Placement head DV, cleaning the air channel

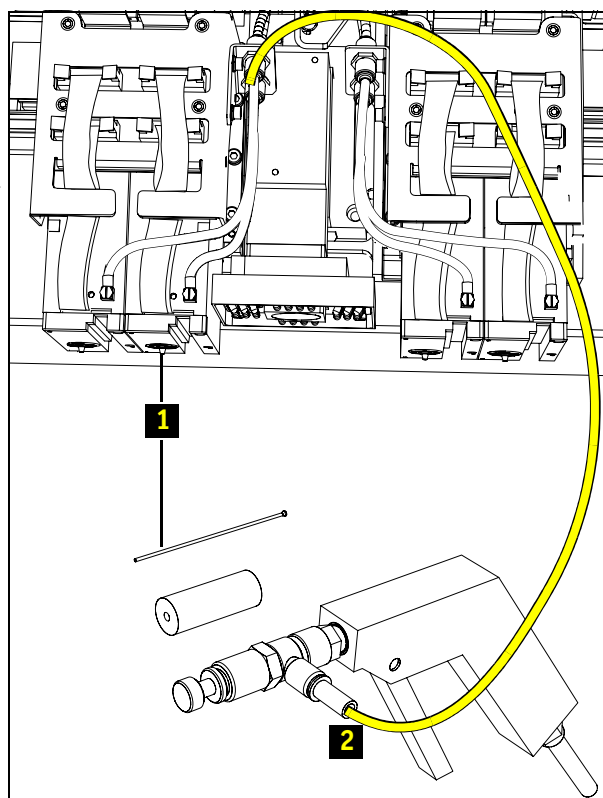
Estimated time to complete [min.]: 15
Required special tools. Set nozzle punches, see [A8.6.4](#)
Placement head cleaning tool, see [A8.6.4](#).
Required part(s) -

1. Prerequisites

- Remove the toolbit from the placement head.

2. Clean the placement head

- Use the punch (1) to loosen contamination in the vacuum channel via the toolbit holder.
- Move the white part of the placement head cleaner (2) over the outer pneumatic connection of the placement head.
- **Completely** squeeze the air gun lever several times to give air pulses of 3 – 5 seconds.
- Repeat the procedure if required.



D7.5 Placement head HA, replacing the dust catch filter in flip chip nozzle

Estimated time to complete [min.]: 3 per nozzle

Required special tools. -

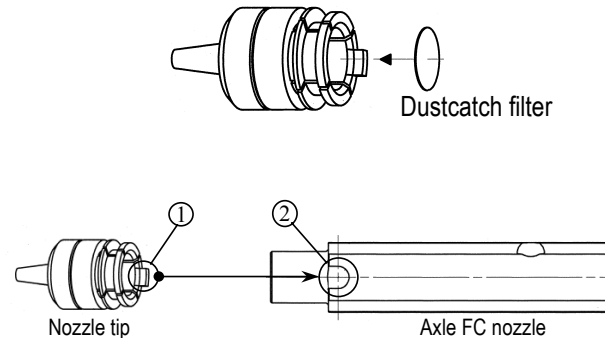
Required part(s) -

1. Replacement

- Pull the nozzle tip from the nozzle (Axle FC nozzle).

Note: Be very careful when pulling the nozzle tip from the nozzle. The edges of the nozzle tip break very easily!

- Flip the polluted filter on its side by slightly pushing against the filter with a pair of tweezers. When the filter is on its side it can easily be removed with the tweezers.
- Carefully pick up the new dust catch filter with tweezers and place it on top of the nozzle tip. Make sure the filter does not bend.
- The filter can now be pushed into the nozzle tip. Push the filter in as far as possible. This can easily be done with a 3 allen key. The top of the allen key must be plane, it may not have any sharp edges or burrs otherwise it will damage the filter.
- Check if the filter is placed correctly by keeping the nozzle tip upside down. The filter may not fall out or move.
- When the new filter is placed in the right position the nozzle tip can be replaced on the axle. When using a new nozzle tip make sure that the o-ring is placed on the nozzle tip. The nozzle tip can be placed on the axle in only one way. The point of the nozzle (1) needs to be slid in the notch (2) of the axle.



D7.6 Placement head HA, replacing the dust catch filter in nozzle

Estimated time to complete [min.]: 5 per nozzle

Required special tools. Ethanol

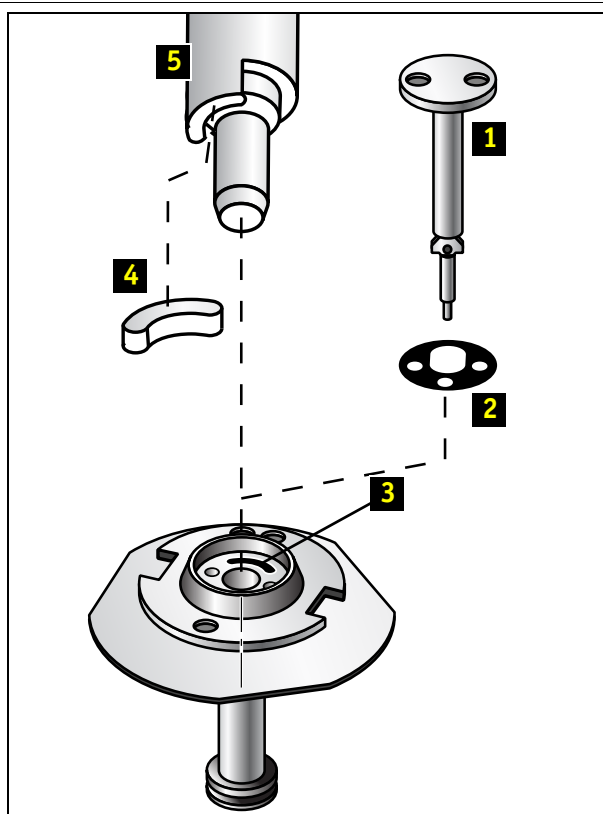
Filter replacement tool

[A8.5.3 Maintenance kit \(PA 2440/00\)](#)

Required part(s) [A8.4.9 Toolbits and gripper for placement head HA](#)

1. Replacement

- Remove the inner nozzle (1).
- Take out the rubber sealing (2).
- Remove the old dust catch filter (3) with a screw driver.
- Clean the nozzle parts with ethanol.
- Place a new dust catch filter (4) with the replacement tool (5).
- Place the rubber sealing (2). The holes in the outer nozzle must not be blocked.
- Mount the inner nozzle (1), take care for the air duct.



D7-00013.fm

D7.7 Placement head HA, replacing the carbon brushes from Z and RZ motor

Estimated time to complete [min.]: 10

Required special tools: Vacuum cleaner

Required part(s) Brushes, [A8.4.8 Placement head HA, spares](#)

This procedure is meant for **preventive** maintenance.

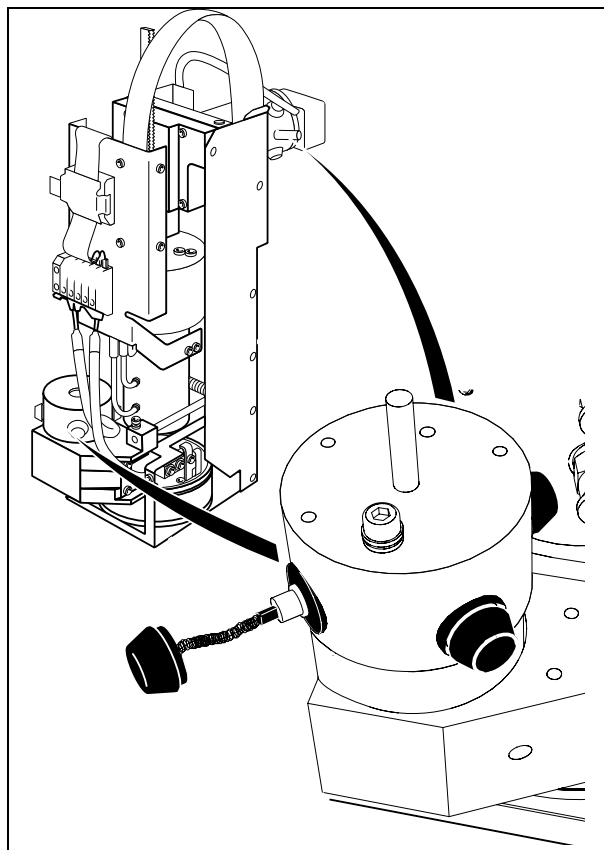
1. Prerequisites

- Remove the trolleys.
- Power down the machine.

2. Replace the carbon brushes

- Remove the old brush with a screw driver.
- Clean area with vacuum cleaner.
- Push in the new carbon brush.

Note: Take care for the spring.



D7.8 Placement head DV and Z-lift, checking, cleaning and lubricating

Estimated time to complete [min.]: 60

Required special tools. Lubrication tool with bended needles
see [A8.5.3 Maintenance kit \(PA 2440/00\)](#)

Required part(s) -

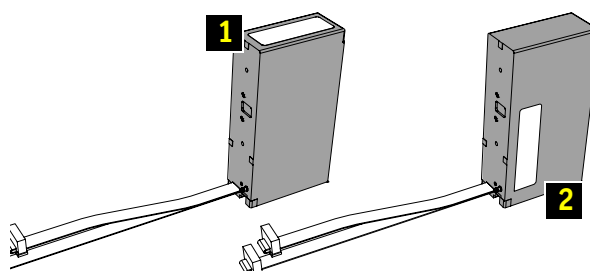


IRRITATING SUBSTANCE

Direct contact may cause irritation of the skin.
Avoid direct contact. Use Personal Protection Equipment.

1. Prerequisites

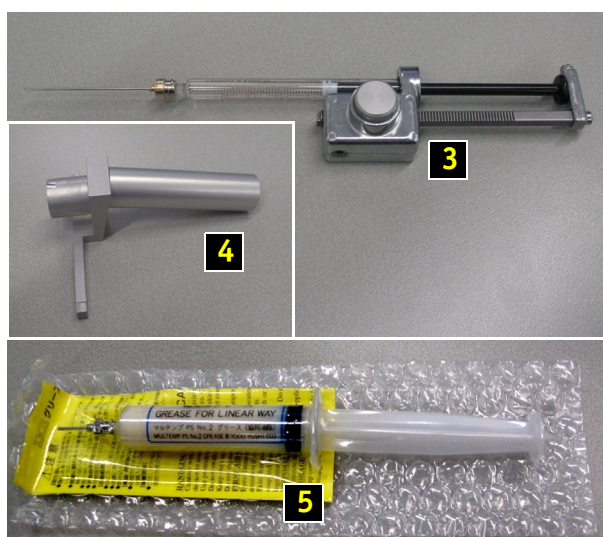
- Remove the placement heads DV, see [D8.2 Placement head DV, head replacement](#).
- Identify placement heads to be lubricated.



Lubrication needed	NO lubrication needed
ID sticker (1) placed on top of the RZ-unit	ID sticker (2) placed on the side of the RZ-unit
ID: 4022-591-054x (x = 0 - 5)	ID: 4022-591-0546

2. Placement head lubrication tools, grease

- * Lubrication-tool (3).
- * Needle guidance (4) for lubricating the placement head.
- * Syringe (5).



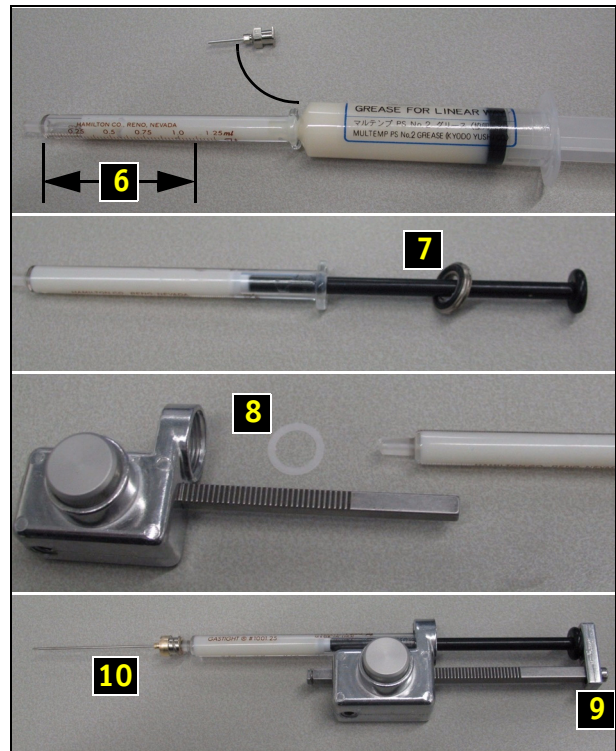
D7-00007.fm

3. Loading the lubrication tool

- Remove the needle from the syringe.
- Fill the lubrication tool container for $\frac{3}{4}$ with grease (6).

Note: Make sure no air bubbles are formed

- Put the plunger through the flange screw (7) and put the plunger in the container.
- Put the nylon ring (8) in-between the tool and the container.
- Install the container into the dispenser.
- Install the needle (10) and plunger arm (9).

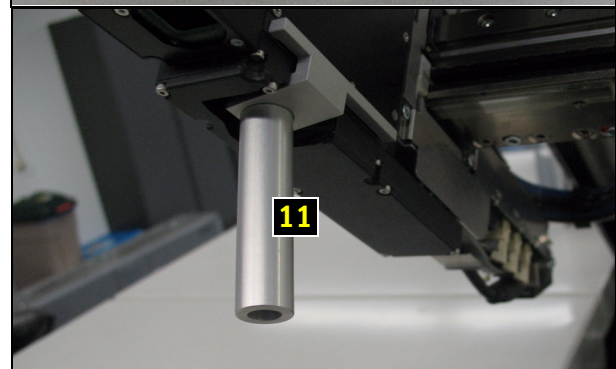


4. Place the needle guidance

- Store all toolbits.

Note: Lubrication of the placement heads can be performed with the machine powered up.

- Place the needle guidance (11) onto the placement head.

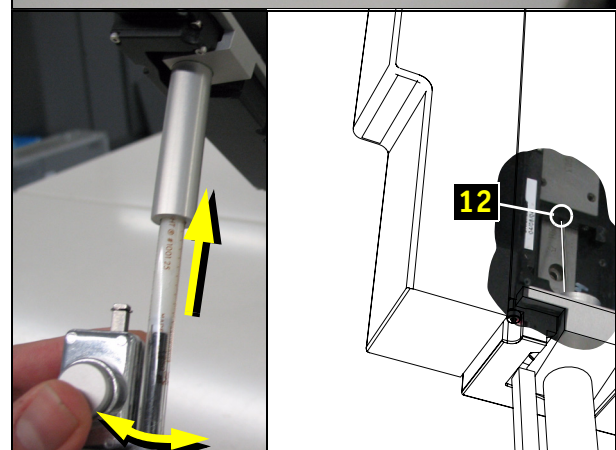


5. Insert lubrication tool

- Insert the lubrication tool through the guidance into the placement head until the needle is inside the linear guide (12).
- Rotate the lubrication tool a little to find the lubrication entry point inside the placement head.

Note: If the needle does not go all the way until the guidance, the needle is bent and must be replaced!

Do not move the guidance in Z-direction when the needle is inserted, this will bend the needle.



6. Lubricate the placement head

- Press the button **once** (13) to lubricate the placement head.

Do not move the guidance in Z-direction when the needle is inserted, this will bend the needle.



7. Finalize

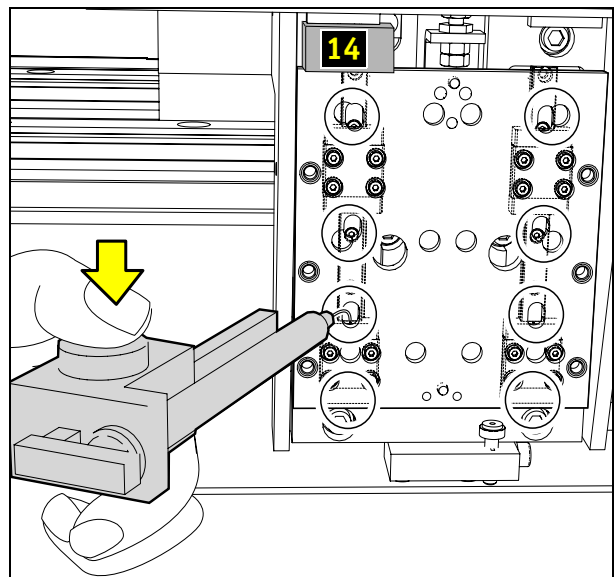
- Remove lubricating tool.
- Remove needle guidance.
- Mount toolbits.

8. Lubricate both Z-lifts

- Replace the needle with the bended one.
- Bleed the needle by pressing the button.
- Bring the Z-lift downwards with the spacer (14).
- Press the button **once**. (8 lubricating points on each Z-lift.)

9. Finalize

- Install the placement heads DV, see [D8.2 Placement head DV, head replacement](#).
- Remove the spacer (14).



D7.9 Placement head HA, checking, cleaning and lubricating

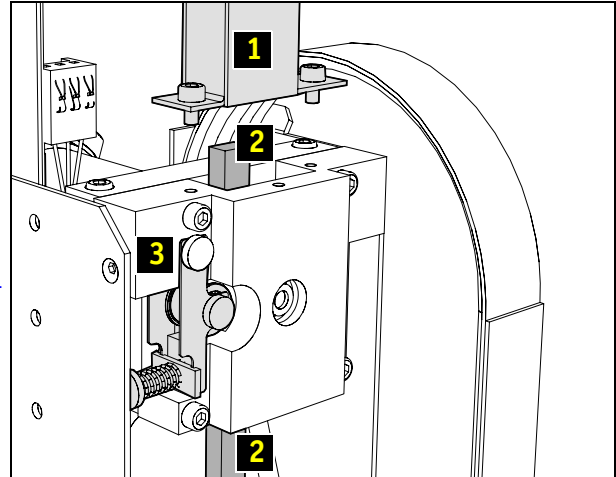
Estimated time to complete [min.]:	20
Required special tools.	Ethanol
Required part(s)	Grease, A8.5.3 Maintenance kit (PA 2440/00)

1. Prerequisites

- Remove the two rear trolleys.
- Power down the machine.

2. Z motor rack and gear

- Remove the cover (1).
- Clean the Z motor rack (2) and gear using fibre free tissue moistened with ethanol;
- Lightly lubricate the Z motor rack (2) and gear with Anti-score EP Lube;
- Check the friction of the Z movement, see [D6.2 Placement head HA, measuring friction of the Z movement](#)

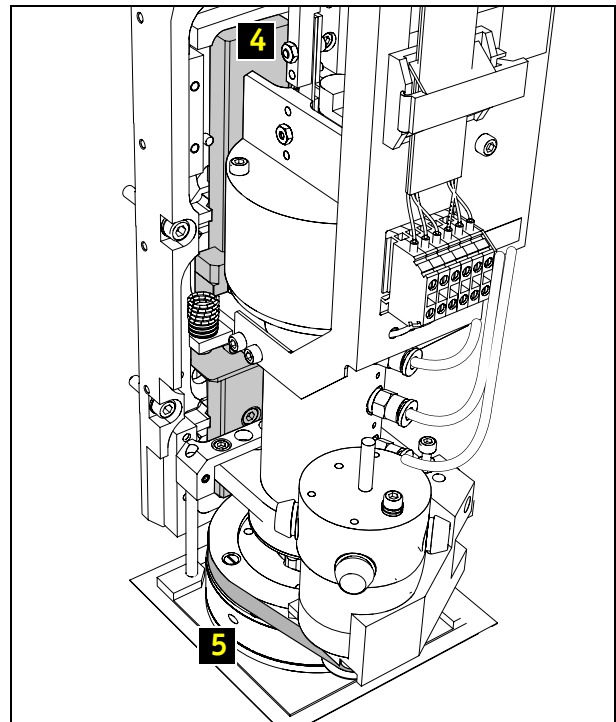


3. Z Motor Rack Tensioner

- Clean the Z motor rack tensioner (3) using fibre free tissue moistened with Ethanol;
- Lightly lubricate tensioner with Anti-score EP Lube.

4. Linear guide rail

- Clean the linear guide rail (4) using fibre free tissue moistened with Ethanol;
- Lightly lubricate the linear guide rail with Isoflex Topas NCA52.



5. RZ belt

- Measure the friction, see [D6.1 Placement head HA, measuring friction of the RZ movement](#)
- Check the RZ belt (5) for wear, replacement , see [D8.8 Placement head HA, RZ belt replacement](#) .

D7-00010.fm

CHAPTER F7 Maintenance instructions



NOTE: Operation, adjustment, maintenance and repair of this machine shall be carried out by **qualified and trained** personnel only.

This chapter contains detailed (corrective and preventive) maintenance instructions.

The preventive maintenance intervals are defined in [A7.3 Preventive maintenance schedule](#) .

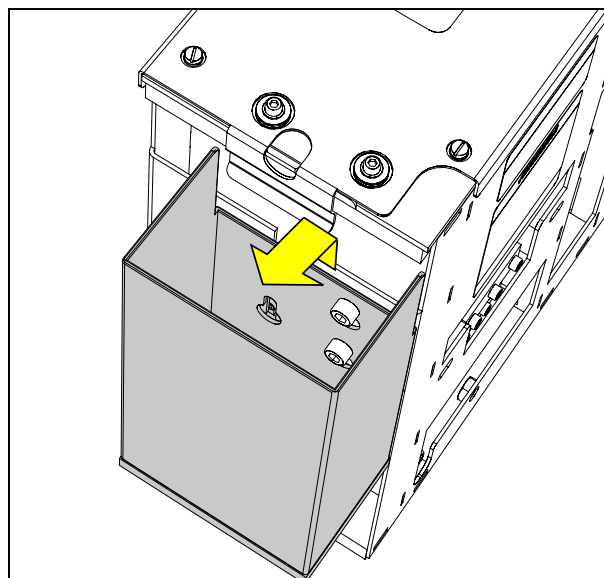
For Material Safety Data Sheets, see [A2.12 Material safety data sheets \(MSDS\)](#)

F7.1 CV camera, cleaning the external waste bin

Estimated time to complete [min.]: 2
Required special tools. Vacuum cleaner
Required part(s) -

1. Cleaning the external waste bin

- Use a vacuum cleaner or empty the external waste bin.
- Remove waste bin by lifting it and move it sideways.



F7-00003.fm

F7.2 Vision markers on CV camera, cleaning

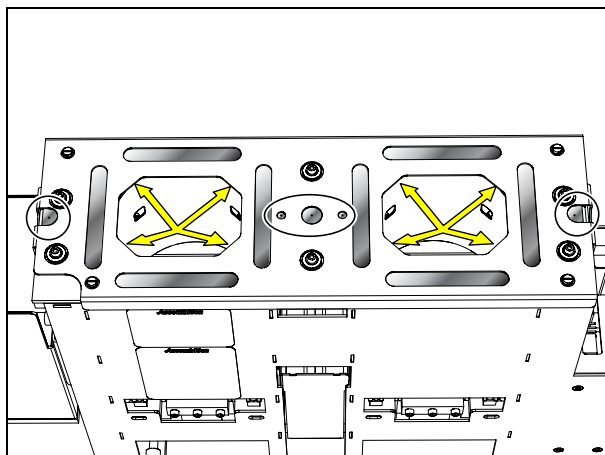
Estimated time to complete [min.]: 5
 Required special tools. Ethanol, fibre free tissues
 Required part(s) -

1. Prerequisites

- Remove trolley.

2. Clean the markers

- Use a fibre free tissue and ethanol.



F7-00006.fm

F7.3 BA camera, cleaning

Estimated time to complete [min.]: 2
Required special tools. Clean air spray, lens tissue
Required part(s)



IRRITATING SUBSTANCE

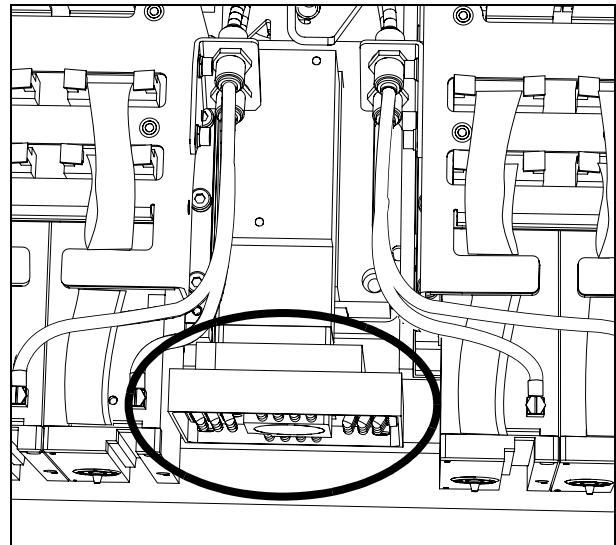
Direct contact may cause irritation of the skin.
Avoid direct contact. Use Personal Protection Equipment.

1. Prerequisites

- Power down the machine.

2. Cleaning the lens of the BA camera

- Remove dust from the board alignment lens using a clean air spray and lens cleaning tissue.
- Clean the LEDs with fibre free tissues.



F7-00002.fm

F7.4 CV camera, cleaning the glass plate

Estimated time to complete [min.]: 15

Required special tools. Fibre free tissue, ethanol, small soft brush

Required part(s) -



IRRITATING SUBSTANCE

Direct contact may cause irritation of the skin.

Avoid direct contact. Use Personal Protection Equipment.

1. Prerequisites

- Stop production.
- Remove the trolley on section 2.
- If necessary, remove the metal cover very carefully.

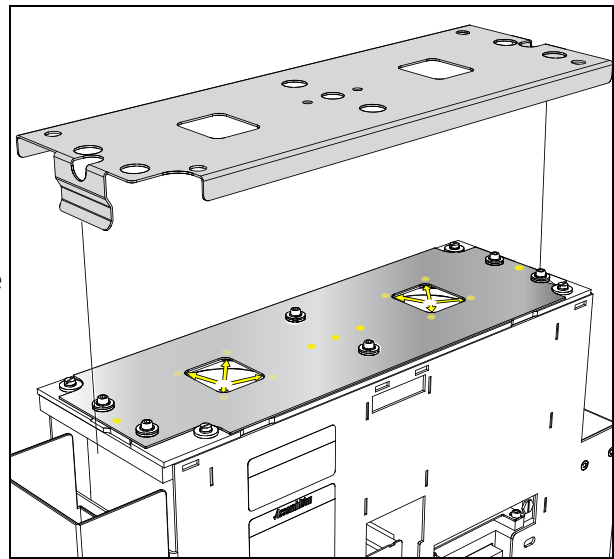
2. Cleaning the CV camera(s)

- Clean the glass plate using a fibre free tissue with ethanol.
Use a soft brush to clean the CV markers underneath.
- Clean the glass plate again with a fibre free tissue but now without the ethanol.
- Clean the rear camera glass plate the same as the front camera.
- Clean the 4 corner markers of the CV camera (8 per glass plate) from the inner side with a very small brush using fibre free tissue and ethanol.

Note: Do NOT remove the glass plate during this cleaning action.

3. Finalize

- Place the trolley back, close the hood and continue production.



F7.5 CV camera, cleaning the internal waste bin

Estimated time to complete [min.]: 2 or 20

Required special tools. -

Required part(s) -

1. Prerequisites

- Remove the trolley in front of the CA camera.
- Type A only: Remove the four bolts (1) and take off the trolley guide in front of the CV camera.

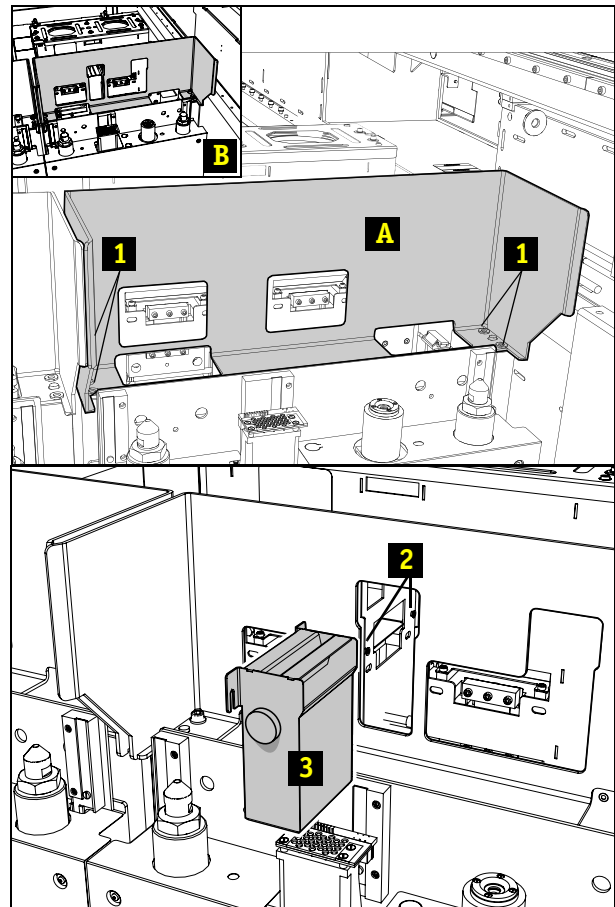
Note: If desired, trolley guide type A can be replaced by type B.

2. Empty the waste bin

- Loosen the mounting bolts (2).
- Take the dump bin (3) out and empty it.

3. Finalize

- Install the dump bin (3).
- When removed, install the trolley guide (four bolts) in front of the CV camera.



CHAPTER G7 Maintenance instructions



NOTE: Operation, adjustment, maintenance and repair of this machine shall be carried out by **qualified and trained** personnel only.

This chapter contains detailed (corrective and preventive) maintenance instructions.

The preventive maintenance intervals are defined in [A7.3 Preventive maintenance schedule](#) .

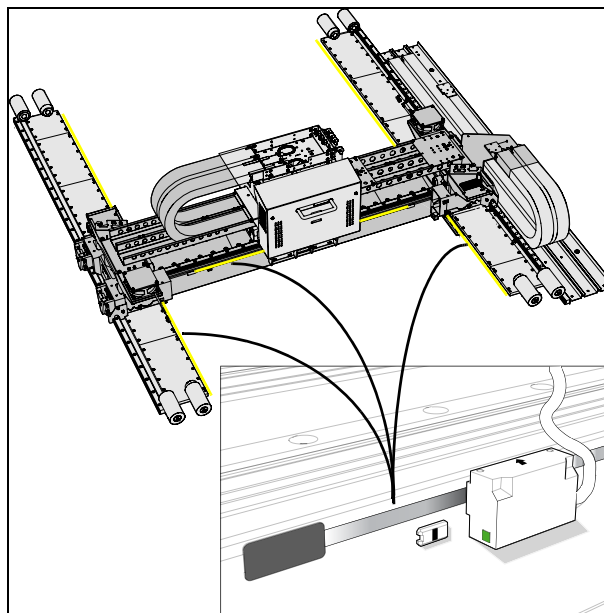
For Material Safety Data Sheets, see [A2.12 Material safety data sheets \(MSDS\)](#)

G7.1 Linear scales on XY robot, cleaning

Estimated time to complete [min.]: 2
 Required special tools. Ethanol
 Required part(s) -

1. Cleaning linear scales and reference markers

- Move the XY robot by hand and clean the newly exposed surface of the X and each Y axis linear scale with ethanol.
- Visually inspect the linear scales and reference markers for signs of wear or damage.



G7.2 Linear guides on XY robot, cleaning and lubricating

Estimated time to complete [min.]:	30
Required special tools	Grease gun with Kluber Isoflex Topas NCA52, see A8.5.3 Maintenance kit (PA 2440/00) , vacuum cleaner (with plastic attachments) fibre free tissues.
Required part(s)	-

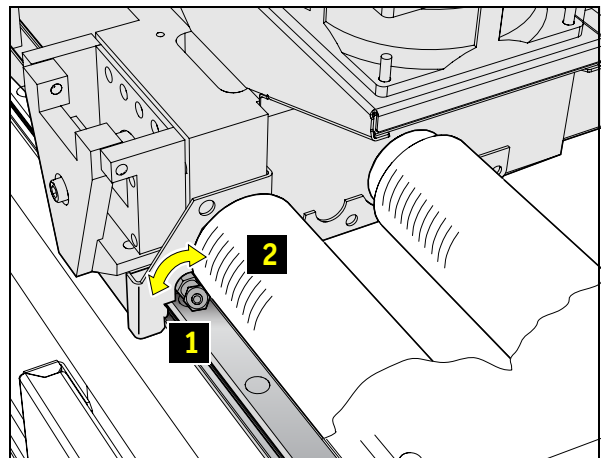


IRRITATING SUBSTANCE

Direct contact may cause irritation of the skin.
Avoid direct contact. Use Personal Protection Equipment.

Until further notice

- Lubricate the linear guides every **2 months**.
 - Rotate the grease nipple (1) on the Y1 and Y2 axe to make it accessible for the grease gun.
 - Apply 3-6 shots while moving the XY robot.
 - Turn the grease nipple (1) back in the initial position to avoid collision with the end stop spring (2).
- Check if grease nipple (1) can pass the end stop spring (2) by moving the XY robot by hand.**



1. Prerequisites

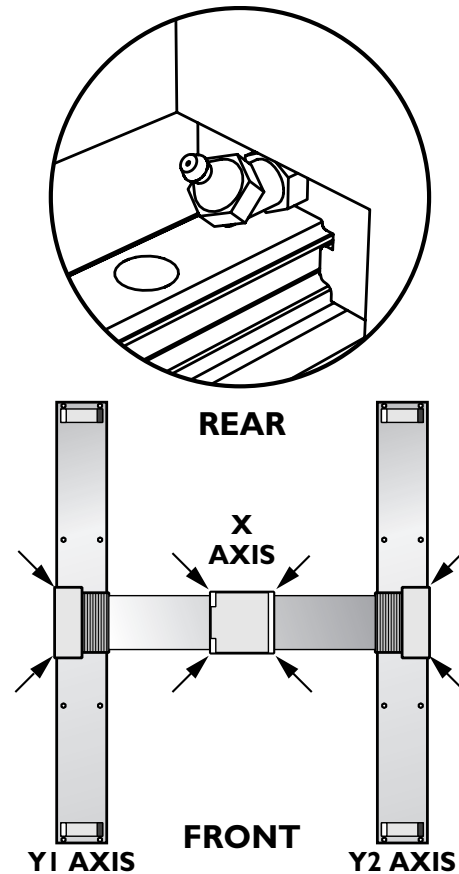
- Remove the trolleys.
- Power down the machine.
- Clean the XY robot area using a vacuum cleaner with plastic attachments to avoid scratching.

2. Cleaning the linear guide rails

- Move all carriages by hand and clean the newly exposed surface of each linear guide rail with fibre free tissues.
- Remove old grease and contaminations.

3. Lubricating the linear guides

- The following grease instructions should be performed at all 3 axis.
 - * Inject **slowly** and with a light pressure two or three shots of grease into the grease nipples. During this action, slowly move the carriage back and forth.
 - * Check if a thin layer of grease is visible at each ball way. If there is grease on other places, the grease was probably injected too fast, or the carriage has not been moved. In that case the procedure must be repeated.
 - * Tilt and remove the grease gun.
 - * Remove excessive grease from all guides, rails and nipples.



G7.3 Fans on X axis, cleaning

Estimated time to complete [min.]: 20

Required special tools. -

Required part(s) -

1. Prerequisites

- Remove the fans, see [G8.9 Fans on X-axis, replacement](#)

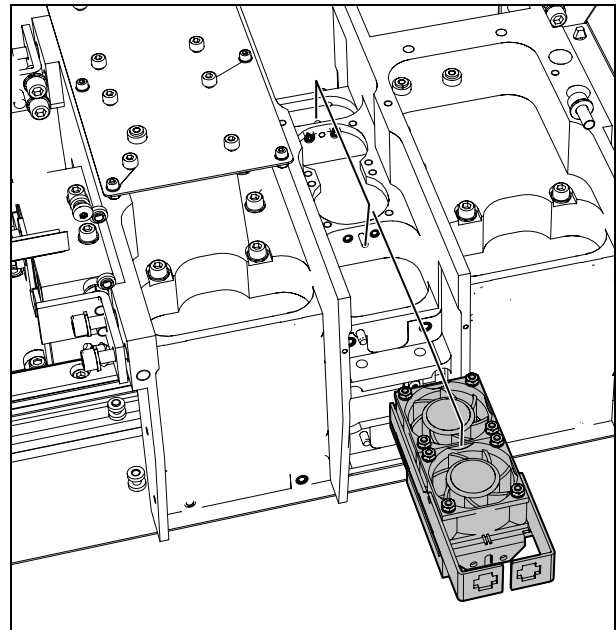
Note: Perform this procedure at the side with the placement heads HA

2. Clean the fans

- Clean the fans with compressed air.

3. Finalize

- Install the fans, see [G8.9 Fans on X-axis, replacement](#)



G7-00005.fm

G7.4 Fans on Y axis, cleaning

Estimated time to complete [min.]: 30
 Required special tools: Vacuum cleaner
 Required part(s) -

1. Prerequisites

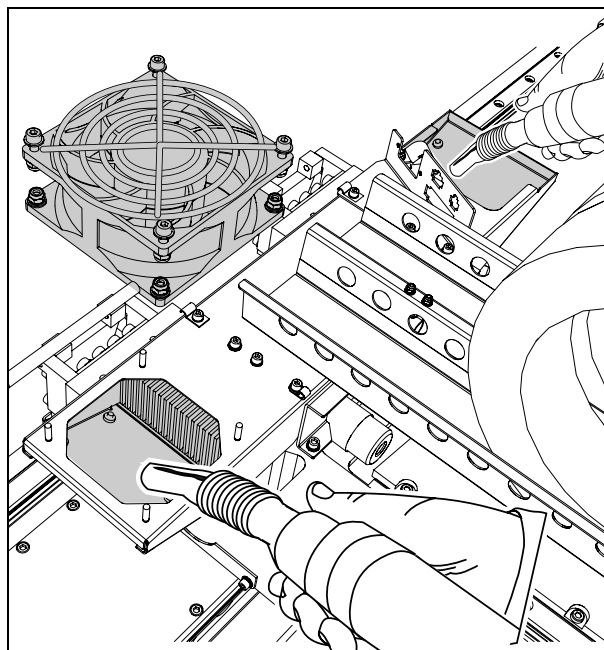
- Remove the fans, see [G8.8 Fans on Y-axis, replacement](#)

2. Clean the fans left and right

- Clean the fans with pressed air.
- Clean the air channels.

3. Finalize

- Install the fans, see [G8.8 Fans on Y-axis, replacement](#)



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MODULE 2. ADDITIONAL INSTRUCTIONS

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 - A5.1.3.2 TIP tools, logoff procedure
 - A5.1.3.3 Board transport, testing via TIP tools
 - A5.1.3.4 Placement head HA, testing via TIP tools
 - A5.1.3.5 Tray trolley, testing via TIP tools
 - A5.1.3.6 Process controller, software and hardware check via TIP tools
- A6.1.1 Exchange calibration procedure
- A8.5 Materials
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 - A8.5.2 Materials, overview
 - A8.5.3 Maintenance kit (PA 2440/00)
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 - A8.5.5 Standard materials
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- C6.1 Transport, release width or lift brake manually
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- D6.1 Placement head HA, measuring friction of the RZ movement
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- G8.8 Fans on Y-axis, replacement
- G8.9 Fans on X-axis, replacement

A5.1.3 TIP tools

A5.1.3.1 TIP tools, start up procedure



NOTE: Make sure that the correct logoff procedure is performed whenever you have been logged on to the system.

1. Start up TIP tools

- Power up the machine.
- Wait until the Windows XP desktop appears.
- Stop the dialogue box 'Start controller' in the task bar.
(Connection to APC must proceed)
- Start 'Remote desktop' icon on desktop.
- Logon as user in the process controller: User name is 'user' with password 'user' (password is completely lower case).
- Start icon 'Start Process TIP tools'
- Start icon 'TIP tools'.
- Type: get programs.tip
Function tree is visible now.
- Select: option A - S.

***** ACM TEST-PROGRAMS. *****
A -- TRP Test-Program. <Transport>
B -- HDH Test-Program. <Heads>
C -- FDR Test-Program 1. <Tray-Trolley>
S -- STOP.
MAKE YOUR CHOICE --> ...

A5.1.3.2 TIP tools, logoff procedure

1. Log off TIP tools

- Select 'S'.
- At prompt >>> type: exit
- After using the TIP tools double-click on <Kill APC Processes> to stop all running process controller processes.
- Shutdown the process controller and system controller by double-click on <power-down>. This icon is located on the system controller.
- Re-start the machine.

***** ACM TEST-PROGRAMS. *****
A -- TRP Test-Program. <Transport>
B -- HDH Test-Program. <Heads>
C -- FDR Test-Program 1. <Tray-Trolley>
S -- STOP.
MAKE YOUR CHOICE --> ...

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A5.1.3.3 Board transport, testing via TIP tools

- Start up TIP tools, see [A5.1.3.1 TIP tools, start up procedure](#)

***** TEST TRANSPORT-BELT MOTORS *****		
Select MOTOR.	Select SPEED. (mm/sec)	Select DIRECTION.
A -- RUN-IN. B -- WORK-AREA. S -- SPEED CHECK. 0 -- EXIT.	A -- ACM-IN. (350) B -- ACM-OUT. (350) C -- TRANSFER-BOARD. (550) D -- POSITION-BOARD. (20) E -- STOP. (0)	A -- FORWARD. B -- BACKWARD.
RUN-IN motor STOPPED.		
WORK-AREA motor STOPPED.		
<p>NOTE: The speed values given in the Select SPEED column, are the speeds as they are defined in the Transport Controller memory.</p>		
MAKE A SELECTION.		

***** TEST MENU TRANSPORT SENSORS + SHEMA *****		
A -- Test TRANSPORT-LIGHT-SENSORS manual. B -- Test TRANSPORT-LIGHT-SENSORS automatic with a PCB. C -- Test SHEMA-IN and SHEMA-OUT. D -- Test SHEMA-IN. E -- Test SHEMA-OUT.		
0 -- EXIT.		
MAKE YOUR CHOICE ---> .		

***** TEST MENU LIFT-UNIT *****		
A -- Test LIFT-UNIT ZERO-COARSE Epd. B -- Test LIFT-UNIT HOME function. C -- Test LIFT-UNIT UP/DOWN. D -- CALIBRATE LIFT-UNIT. P -- PURGE FLASH-PROM.		
0 -- EXIT.		
MAKE YOUR CHOICE ---> .		

***** TEST MENU TRANSPORT WIDTH-ADJUSTMENT *****		
A -- Test TRANSPORT-HOME function. B -- Test TRANSPORT-WIDTH-ADJUSTMENT (ABSOLUTE). C -- Test TRANSPORT-WIDTH-ADJUSTMENT (RELATIVE).		
0 -- EXIT.		
MAKE YOUR CHOICE ---> .		

***** AUTOMATIC TEST GREEN and YELLOW LED'S *****		
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> TRANSPORT CONTROLLER </div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: green; margin-right: 5px;"></div> --> GREEN LED = ON </div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: yellow; margin-right: 5px;"></div> --> YELLOW LED = ON </div>		
PRESS CTRL-C TO STOP.		

***** ENCODER-TEST RUN-IN * WORK-AREA *****		
RUN-IN: (Backw = pos.)	WORK-AREA: (Backw = pos.)	
DESIRED POSITION: -169	DESIRED POSITION: -214	
REAL POSITION: -169	REAL POSITION: -214	
TRACKING WARNINGS: 0	TRACKING WARNINGS: 0	
MAX. ZERO DRIFT LEVEL: 0	MAX. ZERO DRIFT LEVEL: 0	
POWER DIPS: 0	POWER DIPS: 0	
PRESS CTRL-C TO STOP.		

***** ENCODER-TEST WIDTH-ADJUSTMENT * LIFT-UNIT *****		
WIDTH-ADJUSTMENT: (Narrow = pos.)		
DESIRED POSITION:		
REAL POSITION:		
TRACKING WARNINGS:		
MAX. ZERO DRIFT LEVEL:		
POWER DIPS:		
LIFT-UNIT: (UP = pos.)		
DESIRED POSITION:		
REAL POSITION:		
TRACKING WARNINGS:		
MAX. ZERO DRIFT LEVEL:		
POWER DIPS:		
!! ATTENTION !! WHEN THE LIFT IS DOWN IT MAY COME UP. IS THIS ALLOWED? Y/N.		

***** ENDURANCE TEST MENU TRANSPORT AND LIFT-UNIT *****		
A -- Test TRANSPORT: PCB from RI to WA and back. NO LIFT-CLAMP. B -- Test TRANSPORT: PCB from RI to WA and back. LIFT-CLAMP. C -- Test LIFT-UNIT UP/DOWN. D -- Test TRANSPORT-BELTS.		
0 -- EXIT.		
MAKE YOUR CHOICE --->		

A5-00007.fm

```

***** MENU FRICTION-TESTS. *****

(...) A -- CHECK ONE COMPLETE CYCLE RUN-IN BELT.
(...) B -- CHECK ONE COMPLETE CYCLE WORK-AREA BELT.

      D -- EXECUTE OPTION A-B ONE BY ONE.

(...) E -- CHECK LIFT-UNIT ALONG A STROKE FROM: 1) Z=0 TO Z=-51 mm.
                                              2) Z=-51 TO Z=-12 mm.

(...) F -- CHECK TRANSPORT-WIDTH ALONG A STROKE FROM 50 UP TO 460 mm.

      0 -- EXIT.

MAKE YOUR CHOICE --->

```

- Log off TIP tools, see [A5.1.3.2 TIP tools, logoff procedure](#)

A5.1.3.4 Placement head HA, testing via TIP tools

- Start up TIP tools, see [A5.1.3.1 TIP tools, start up procedure](#)

```

***** MAIN TEST-MENU HEAD-HANDLER *****

A -- Test the VALVES.
B -- Test GREEN and YELLOW Led.
C -- Test Z-MOTOR.      (Signals and Movements)
D -- Test PHI-MOTOR.    (Signals and Movements)

E -- Test Z-FORCE CONTROL-UNIT.
F -- Execute VACUUM Measurement.

G -- Monitor FIRMWARE-Version.
H -- CHANGE CONFIGURATION.

I -- ENDURANCE-TESTS.
J -- .....

      0 -- EXIT.

MAKE YOUR CHOICE --->

```

```

***** TEST ALL VALVES *****

A -- SWITCH ON OPEN-GRIPPER VALVE.
B -- SWITCH ON VACUUM VALVE.
C -- SWITCH ON BLOWER VALVE.
D -- SWITCH ON RELEASE-TOOLBIT VALVE.

E -- AUTOMATIC ON/OFF OPEN-GRIPPER VALVE.
F -- AUTOMATIC ON/OFF VACUUM VALVE.
G -- AUTOMATIC ON/OFF BLOWER VALVE.
H -- AUTOMATIC ON/OFF RELEASE-TOOLBIT VALVE.

S -- SELECT HEAD.      (ACTIVE NOW = HEAD-1)

      0 -- EXIT.

MAKE YOUR CHOICE -->

```

HEAD-NR -> 1
* STATE *
.
.
.
.
.
.
.

```

***** AUTOMATIC TEST GREEN and YELLOW LED'S *****

TIP    HEAD-1    HEAD-2    HEAD-3    HEAD-4    H-DRIVE
-----
      IN CONFIG.  IN CONFIG.  NOT IN CONFIG.  NOT IN CONFIG.

PRESS CTRL-C TO STOP

```

```

***** TEST Z-MOTOR *****

A -- HOME HEAD-1.
B -- MOVE HEAD-1 TO Z-SAFE-POSITION (EPD).
C -- MOVE HEAD-1 UP/DOWN.

D -- FIND IMPACT-POINT HEAD-1.
E -- ENCODER CHECK HEAD-1.
F -- SHOW/CHANGE STATE HEAD-1.
G -- .....

S -- SELECT HEAD.      (ACTIVE NOW = HEAD-1)

      0 -- EXIT.

MAKE YOUR CHOICE --> .

```

OFFSET	
HEAD-1	incr.
HEAD-2	incr.
HEAD-3	NOT IN CFG.
HEAD-4	NOT IN CFG.

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***** TEST PHI-MOTOR *****

A -- HOME HEAD-1.
B -- MOVE PHI HEAD-1 LEFT/RIGHT.

C -- ENCODER CHECK HEAD-1.
D -- SHOW/CHANGE STATE HEAD-1.
E --

S -- SELECT HEAD. <ACTIVE NOW = HEAD-1>

0 -- EXIT.

MAKE YOUR CHOICE -->

***** MEASURE Z-FORCE *****

A -- RELEASE TOOLBIT HEAD-1.
B -- CHECK Z-FORCE SENSOR HEAD-1.

C --

S -- SELECT HEAD. <ACTIVE NOW = HEAD-1>

0 -- EXIT.

MAKE YOUR CHOICE -->

***** MEASURE VACUUM *****

A -- GRIP TOOLBIT HEAD-1.
B -- RELEASE TOOLBIT HEAD-1.
C -- EXECUTE VACUUM MEASUREMENT HEAD-1.
D -- EXECUTE VACUUM MEASUREMENT ALL CONFIGURED HEADS.
E --

S -- SELECT HEAD. <ACTIVE NOW = HEAD-1>

0 -- EXIT.

MAKE YOUR CHOICE -->

***** MAIN TEST-MENU HEAD-HANDLER *****

A -- Test the VALUES.

HDH Test-Software-Version: HDH-11*02*99

*** FIRMWARE VERSION-NR's ***

	IN CONFIG.	VERSION Nr.
HEAD-1 . . .	YES	HC--13.94
HEAD-2 . . .	YES	HC--13.94
HEAD-3 . . .	NO
HEAD-4 . . .	NO

0 -- EXIT.

***** PRESS ANY KEY TO CONTINUE *****

***** MAIN TEST-MENU HEAD-HANDLER *****

A -- Test the VALUES.
B -- Test GREEN and YELLOW Led.
C -- Test Z-MOTOR. <Signals and Movements>
D -- Test PHI-MOTOR. <Signals and Movements>

E -- Test Z-FORCE CONTROL-UNIT.
F -- Execute VACUUM Measurement.

G -- Monitor FIRMWARE-Version.
H -- CHANGE CONFIGURATION.

I -- ENDURANCE-TESTS.
J --

0 -- EXIT.

1 = ADD A HEAD TO THE CONFIG. 2 = REMOVE A HEAD FROM THE CONFIG. 3 = STOP.

***** DIAGNOSTICS *****

HEAD-1.
SPEED FACTOR.....: 100 %
WAIT-TIME.....: 0 ms.
MOVEMENT CLASS.....: 0

NR. OF Z-MOVES.....: 0
TOTAL Z-TIME.....: 0 Min.
NR. OF PHI-MOVES.....: 0
TOTAL PHI-TIME.....: 0 Min.

Z-TRACKING WARNINGS..: 0
PHI-TRACKING WARNINGS: 0
Z-ZERO DRIFT LEVEL...: 0
PHI-ZERO DRIFT LEVEL.: 0

NR. OF POWERDIPS.....: 0

***** ENDURANCE TEST MENU *****

A -- START ENDURANCE Z-MOTOR HEAD-1.
B -- START ENDURANCE PHI-MOTOR HEAD-1.
C -- START ENDURANCE Z*PHI-MOTOR HEAD-1.
D -- STOP ENDURANCE Z-MOTOR HEAD-1.
E -- STOP ENDURANCE PHI-MOTOR HEAD-1.
F -- STOP ENDURANCE Z*PHI-MOTOR HEAD-1.

G -- RESET DIAGNOSTICS OF HEAD-1.
H -- SET SPEED FACTOR. <default=100%>
W -- SET WAIT-TIME BETWEEN TWO MOVES.

R -- REMOVE TOOLBIT.
S -- SELECT HEAD. <ACTIVE NOW = HEAD-1>
U -- UPDATE DIAGNOSTICS.

0 -- EXIT.

MAKE YOUR CHOICE -->

- Log off TIP tools, see [A5.1.3.2 TIP tools, logoff procedure](#)

A5-00007.fm

A5.1.3.5 Tray trolley, testing via TIP tools

- Start up TIP tools, see [A5.1.3.1 TIP tools, start up procedure](#)

C - FDR Test Program. **T** - Tray trolley commands
N - New controller

Select section
A - Purge flashprom
B - Read all parameters from flashprom
C - Reset all parameters in flashprom
D - PID parameters lift to flashprom
E - PID parameters puller to flashprom
F - PID parameters snap-in to flashprom
G - Movement classes to flashprom
H - Diagnostics to flashprom
I - Offset parameters to flashprom
J - Calibration parameters to flashprom
0 - exit

C - Calibration

A - Calibrate lift offset
B - Set lift / puller / snap-in offset manually
D - Write pitch / lift / free position
E - Write hook / park / lock position
F - Write eject / hook zero / - position
G - Write pick / eject / - position
H - Write level zero / pick / - position
R - Read position from flashprom
S - Select servo, 0=lift / 1=puller / 2=snap-in
U - Update real position
W - Write positions to flashprom

M - Maintenance and Service

D - Display sensor state
I - Initialise trolley
L - Move lift to selected tray: 1=slide / 2=hook / 3=eject
P - Move puller: 1=pick / 2=lift / 3=park / 4=hook / 5=eject
S - Move snap-in: 1=free / 2=lock
T - Tray selection
V - Verify sensor adjustments: 1=zero sensors /
2=carrier in store / 3=safe on lift
X - Shutdown trolley
0 - exit

E - Endurance

A - Start endurance all
B - Start endurance lift
C - Start endurance puller
D - Start endurance snap-in
P - Set servo endurance positions
R - Reset diagnostics
U - Update diagnostics
S - Set speed factor
0 - exit

S - Servo

A - Lift amplifier on
B - Puller amplifier on
C - Snap-in amplifier on
M - Movement class menu
P - PID Menu
R - Read servo positions
U - Update servo diagnostics
S - Set speed factor
0 - Exit

X - Extra Tools

C - Check Z-level
S - Sensor test
B - Between test
F - Full load test
J - Eject all carriers
E - Endurance mode
K - Component class
W - Write contents of flash to file

- Log off TIP tools, see [A5.1.3.2 TIP tools, logoff procedure](#)

A5-00007.fm

A5.1.3.6 Process controller, software and hardware check via TIP tools

For basic checks on the software and hardware of the process controller, a tipscript (aitcheck.tip) has been made.

1. Start-up TIP tools

- Logon to the system as 'Administrator'.
- Wait until the process controller Status window is disappeared (This means the process controller is booted)

Note: If it takes longer than 5 minutes for the process controller Status window to disappear it is possible that the process controller booted before the boot procedure of the system controller was finished. In that case one could also continue to the next step.

- Double-click on <VNC APC> on the desktop to start the Vnc program
- Wait until the desktop of the process controller becomes visible.

Note: If the program could not connect to the process controller it will give a warning. This means the process controller is probably not booted yet, wait a few seconds and try again.

- On the desktop of the process controller double-click on <Start aPC processes for TIP>. This will start only those processes that must run for the use of the TIP tools.
- On the desktop of the process controller double-click on <TIP tools> to start the TIP tools.
- Enter: `get aitcheck`
- Enter: `Thw_ok` or `Thw_endurance`.

A6.1.1 Exchange calibration procedure

Estimated time to complete [min.]:

Required special tools. Calibration nozzle for CV and placement heads

Required part(s)

1. Prerequisites

- Login as M&S engineer.
- Select 'Maintenance'.
- Select the concerning module.

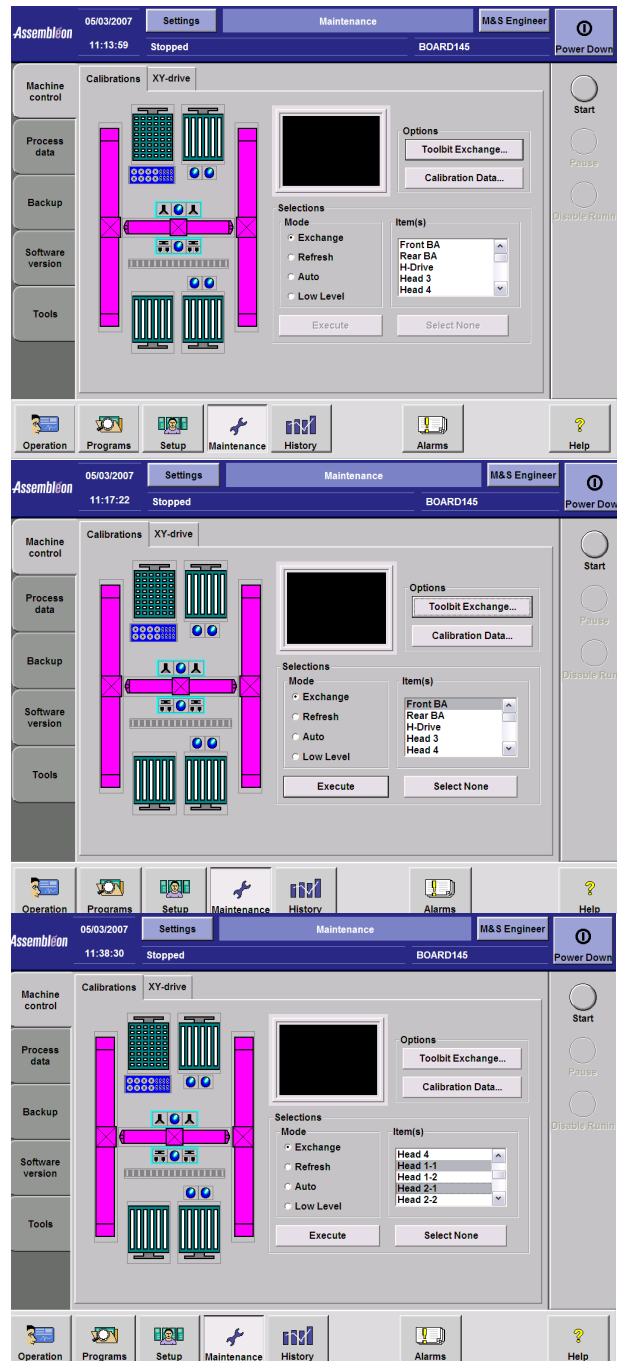
Note: All related calibrations will be performed after selecting it. Below the different sub calibration steps are described for each module.

2. Front BA camera

- Pixel size and camera orientation,
- Head marker,
- XY robot is homing,
- Head/BA relation head 1
- RZ head 1
- Head/BA relation head 2
- RZ head 2

3. HEAD 1 and/or 2 (PH-DV)

- Calibration nozzle
- Z=0,
- Force table,
- Head/BA relation,
- RZ.



4. FEED SECTION 1 and/or 2

- XY position,
- Z level.

5. TOOLBIT EXCHANGE UNIT

- XY position.

6. FRONT CV

- Calibration nozzle
- Head marker,
- XY robot is homing,
- CV Left/Right,
- Head 1 and 2 Z=0,
- CV Transmission and reflection light levels (left and right camera),
- Camera orientation + pixel size,
- Feed sections XY position and Z levels,
- Toolbit exchange unit

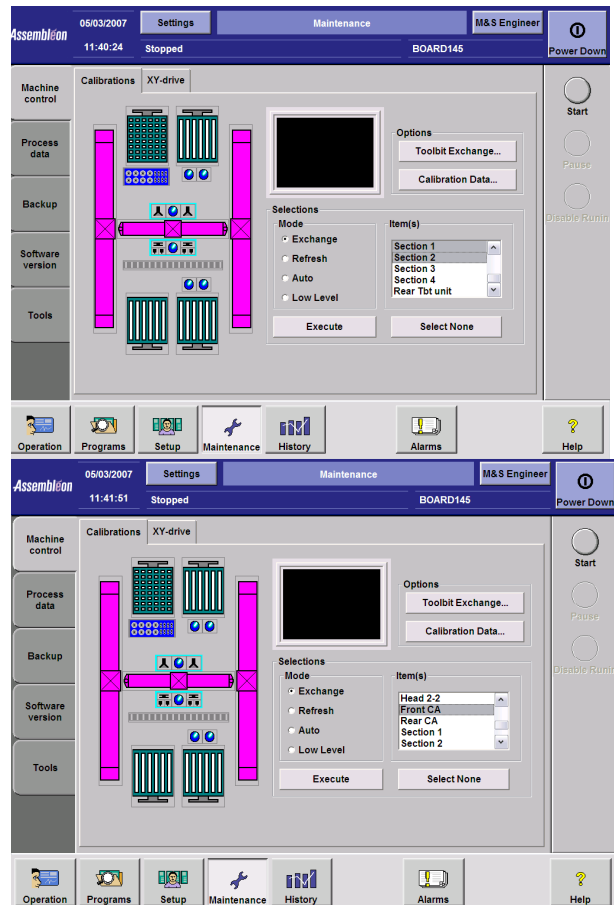
7. Rear BA camera

8. Rear CV camera

9. Rear placement heads (PH-DV or PH-HA)

10. Finalize

- After these steps switch to low level to calibrate the board transport.
See [A6.1.4 Low level calibration procedure](#)



A8.5 Materials

A8.5.1 Materials, definitions

- Standard materials Tools and materials needed for preventive maintenance, local obtainable
- Maintenance kit A collection of spare parts and materials that enables the customer to perform preventive maintenance, based on a 2 year period and a maximum machine configuration, and also simple repairs that do not require specific knowledge or tools. This collection is available as a PA number via regular commercial channels.
- Second level spare parts A collection of spare parts that is recommended to be available on-site at the customer. The collection of parts is defined to minimize the machine downtime, taking into account the failure probability of parts and machine modularity. This collection is not available as a kit but can be ordered for each part separately.
- Description Name of the material.
- Ordering code The code number with which the material or material kit can be ordered at your regional service center.
- Application Indication of what purpose the material is used for. In case of a part, the assembly it belongs to is mentioned. In case of a material, the maintenance action it is used for is mentioned.
- Picture/spare part reference Information to identify the material when applicable. Either a picture or a reference to a drawing in the spare part section.

A8.5.2 Materials, overview

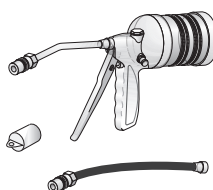
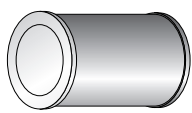

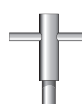


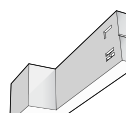





[A8.5.5 Standard materials](#)

[A8.5.3 Maintenance kit \(PA 2440/00\)](#)

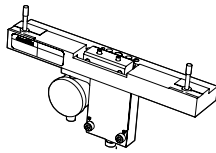

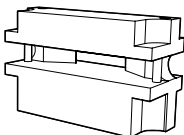


[A8.5.6 Second level spare parts](#)

[A8.5.7 Consumables](#)

A8.5.3 Maintenance kit (PA 2440/00)

Description	Ordering code	Amount	Used for	
Lubricating kit				
Grease gun	5322-395-10615	1	-	
Flexible hose	9498-396-02040	1	-	
Protection cap	-	1	-	
(Kluber) Isoflex Topas NCA52	5322-390-10151	1	Grease for XY robot bearings	
Lithium based grease NSK 1	5322-390-20159	1	Transport spindles, guides	
Anti score EP lube 3 grease	9498-396-00143	1	Placement head HA Z-motor, guide	
Optical kit				
Camel hair brush, optical tissues	9498-396-00043	1		
Miscellaneous				
Dust catch filter tool	5322-395-10774	1	Replacement tool for filters in placement head HA nozzles	
Board dismantling tool	5322-395-10282	1	Remove controller boards from control supply unit	
Filter element 0.3	9498-396-00062	2	Pneumatic air supply	
Filter (fan)	9498-396-01724	6	Air filter controllers	
Calibre Z-lift	9498-396-01905	1	Z-lift placement heads DV, adjustment	
Tie-wraps 15 cm	-	100	Fixation cables heads	
Tie-wraps 10 cm	-	100	Fixation cables heads	
Flatcable bracket (Large)	-	5	Placement head DV and Z-lift	
Loctite 243	-	1	All screws above Z=0 level unless otherwise defined	
Fuse puller	9498-396-02119	1	Pull fuses from boards	
PU HOSE 4	-	1 mtr	Manifold from AQ to AX-201	

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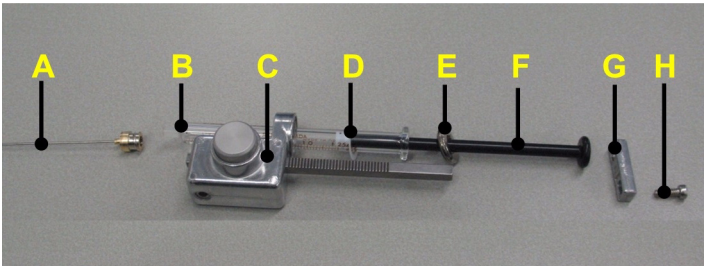

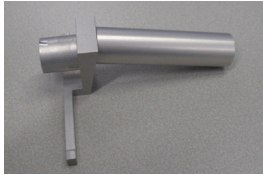
Description	Ordering code	Amount	Used for	
Encoder tool	9498-396-02059	1	Adjustment of encoders on Y-axes	
Plastic distance plate	9498-396-02075	1	X encoder adjustment	
Linear scale mounting tool on X-axis	9498-396-02024	1	-	
Linear scale mounting tool on Y-axes	9498-396-02026	1	-	
Assortment box				
Dust catch filter	5322-480-10169	1	Nozzle placement head HA	
Carbon brushes	9498-396-01388	16	Motors placement head HA	
Fuse slow F5x20 2 A	9498-396-00492	20	All boards	
Fuse slow F5x20 4 A	9498-396-00263	20	All boards	
Screw M1.8X4	5322-502-14433	20	Nozzle	
Screw M2.5X 8	9498-396-00250	10	Sensor Z-lift	
Screw M3X5	9498-396-00390	20	Placement head DV on interface bracket	
Screw M3X6	9498-396-00474	20	Encoder on X-axis	
Screw M3X8	9498-396-00475	20	Manifolds	
Screw M3X16	9498-396-00476	20	Encoder on Y-axes, power supply	
Screw M4X6	9498-396-01882	20	Controllers placement head DV Bracket pneumatic controller	
Screw M4X8	9498-396-01883	10	Clamps, pneumatic controller, fans Y-axis	
Screw M4X10	9498-396-01884	20	Bracket pneumatic controller Z-lift placement heads DV	
Screw M4X12	5322-502-14434	20	Interface placement head HA, bottom	
Screw M4X16	9498-396-01885	10	X-sensor	
Screw M4X20	9498-396-00584	20	Interface placement head HA, top	
Screw M4X25	9498-396-01886	10	BA camera	
Hex lock nut M4	9499-396-00665	10	Fans Y-axis	
Washer 3.2X7	9498-396-00699	20	All M3 screws placement head DV, manifold	
Curved spring washer M3	9498-396-00769	20	All M3 screws	
Curved spring washer M4	9498-396-00903	20	All M4 screws used in X-carriage	

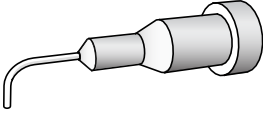
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Description	Ordering code	Amount	Used for	
Washer PF 3.2X7	9498-396-00951	20	Protection boards, manifold, DV controllers	
Washer 4.3X9	9498-396-00904	20	All M4 screws placement head DV on bracket	
Washer PF-CP M2,5	9498-396-01068	20	Manifold placement head HA	
Earth washer STL ST 4.3X8	9498-396-01069	10	Fans, brackets	
Earth washer STL ST 5.3X10	9498-396-01082	10	Hood, side plate	
Earth washer STL ST 6.4X14	9498-396-01188	10	Earth to covers	
O-ring placement head HA	5322-530-10386	10	Nozzle interface	
O-ring 2.3 x 0.9	5322-530-51243	10	Behind pressure sensor on manifold HA Pneumatic controller interface	
Sealing plate	5322-466-12073	10	For nozzles placement head HA	
Fixing eye of tie-wrap	9498-396-01394	10	Cables in control supply unit	
Hose pillar RTU-PK-3/3	9498-396-01881	6	Manifold from AQ to AX-201	
Contact pen	9498-396-00125	5	Trolley to lift electrical interface	
PCB spacer RLCBSRE-10	9498-396-01887	10	Placement head HA, transport controller in control supply	
Cable clamp	9498-396-01888	10	Base	
Cable clamp 4.8	9498-396-01889	10	Encoder cable, BA camera	
Flatcable bracket (Small)	-	5	Control supply unit	
End stop Z-lift DOWN	9498-396-01892	4	Z-lift placement head DV	
End stop Z-lift UP	9498-396-01893	8	Z-lift Placement head DV	

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A8.5.4 Lubricating tool for placement head DV and Z-lift

Placement head lubrication tool 9498-396-01954			
A	Needle (set of 6)	9498 396 01998	
B	Container	9498 396 02000	
F	Plunger		
C	Dispenser	9498 396 01999	
D	Nylon ring		
E	Flange screw		
G	Plunger arm		
H	Screw		
Grease (IKO)		9498 396 02001	
Needle guidance		9498 396 01996	

Bended needle		9498-396-02438	
---------------	--	----------------	--

A8.5.5 Standard materials

Description	
Fibre free tissue	Local purchase
Keyboard cleaner	Local purchase
Ethanol	Local purchase
Clean air spray	Local purchase
Vacuum cleaner with plastic attachments	Local purchase
Anti-static spray	Local purchase
Molykote metal protector	Local purchase
Loctite 243	Local purchase
Protective gloves	Local purchase
Brush soft	Local purchase
Multimeter	Local purchase

A8.6 Tools

A8.6.1 Tools, definitions

- Recommended **standard** tools
Tools that are used for general purposes during service and maintenance activities. Local purchase by the customer is expected.
 - Recommended **special** tools
Tools that are used for specific purposes during service and maintenance activities. Local purchase by the customer is expected.
 - Recommended **Assembléon** tools
Tools that are used for specific purposes during service and maintenance activities and that are available via Assembléon. Tools can be ordered separately or as part of a tool set, using the regular commercial channels.
-
- | | |
|------------------------------|---|
| • Description | Name of the tool |
| • Application | Indication of what purpose the tool is used for. |
| • Ordering code. | The code number with which the tool or the tool-set can be ordered at your regional service center. |
| • Identification and picture | Information to identify the tool, either a picture or an identification number if applicable, or both. The last digit of an identification number indicates the version of a certain tool. The higher this digit the later the tool. The listed identification number is the minimum required version. All later versions are compatible. |

A8.6.2 Tools, overview

[A8.6.6 Recommended Assembléon tools](#)

[A8.6.3 Recommended standard tools](#)

[A8.6.5 Recommended special tools](#)

[A8.6.4 Setup tooling kit \(PA 2435/00\)](#)

A8.6.3 Recommended standard tools

Quantity	Description
1	Open end/ring wrench 5 mm
1	Open end/ring wrench 5.5 mm
1 set	Open end/ring wrenches 6 - 24 mm
1	Socket screwdriver 4 mm
1	Socket screwdriver 5 mm
1	Socket screwdriver 7 mm
1	Socket screwdriver 8 mm
1	Socket screwdriver round-head 2.5 mm
1	Socket screwdriver round-head 3 mm
1	Socket screwdriver round-head 4 mm
1	Socket screwdriver round-head 5 mm
1	Allen key 0.9 mm
1	Allen key 1.27 mm
1 set	Allen key 1.5 - 10 mm
1 set	Allen wrenches (short)
1 set	TORX screwdrivers T7 - T40
1	Screwdriver TORX T6
1	Screwdriver TORX T7
1	Screwdriver TORX T10
1	Screwdriver TORX T15
1	Screwdriver no. 1 insulated
1	Screwdriver no. 2 insulated
1	Screwdriver no. 3 insulated
1	Screwdriver no. 4 insulated
1	Screwdriver no. 5 insulated
1	Screwdriver no. 4 short
1	Screwdriver no. 4 square
1	Screwdriver clamping M2 - M3.5
1	Screwdriver clamping M3.5 - M5
1 set	Precision screwdrivers
1	Phillips screwdriver no. 0
1	Phillips screwdriver no. 1
1	Phillips screwdriver no. 2
1	Measuring tape 2 meter
1	Calliper gauge 150 mm
1 set	Feeler gauges 0.03 - 0.5 mm
1	ESD-set
1	Multi meter

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A8.6.4 Setup tooling kit (PA 2435/00)

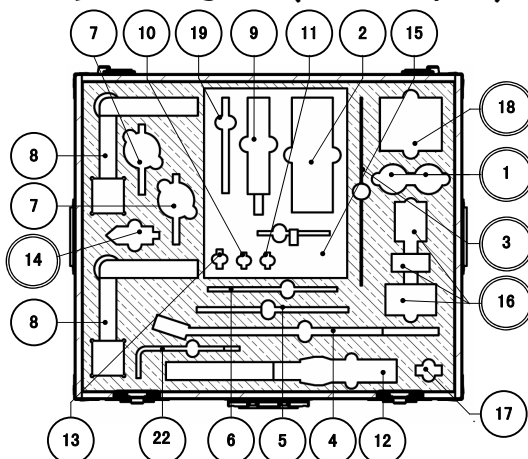




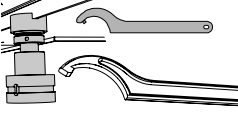

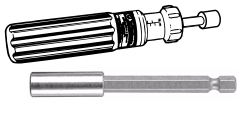


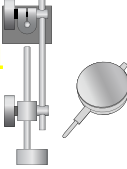
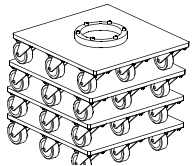


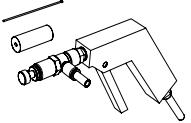
Figure 83 Setup tooling kit , contents

Item	Description	Qty	Ordering code	Application	Identification and picture
1	Calibration nozzle	2	5322-360-10311	Calibration, placement head HA	
18	Nozzle set 5 x L8	1	9498-396-01874	Calibration, placement head DV	
2	Spirit level	1	9498-396-00097	Levelling	
14	Plumb line	1	-	Positioning	
4	Open ended spanner 36 mm	1	9498-396-00037	Levelling, mounting on crate bottom	
5	Hook spanner 68-75	1	9498-396-00035		
16	Levelling jig	1	9498-396-02082	Machine levelling (Hook spanner 68-75 is item 5)	
6	Hook spanner 45-50	1	9498-396-02078		
12	Torque wrench 10-100 Nm	1	9498-396-02079		
17	Bit holder insert tool	1	9498-396-02080		
13	Hex bit 8 mm	1	9498-396-02081		
9	Torque screw driver 0-6 Nm	1	9498-396-02084		
19	Extended bit holder 150 mm	1	9498-396-02085		
11	Ball hex 4	1	-		
10	Ball hex 3	1	-		
22	Panel removal key	1	9498-396-02083		
3	Transport calibration plate	1	5322-466-11588	Calibration	
7	Clock gauge	2	9498-396-00181	Levelling, range 10 mm, accuracy 0.01 mm. Support	
8	Measuring support	2	9498-396-00182		



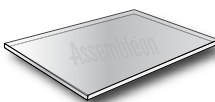
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A8.6.4.1 Setup tooling, optional tools



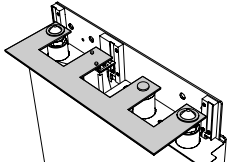
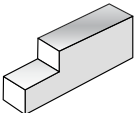

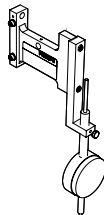
Description	Ordering code	Application	Identification and picture
Installation wheel set	9498 396 00145	Set of 4 lorries for manual machine transportation.	4022 510 1763 

Description	Ordering code	Application	Identification and picture
Placement head cleaning tool	9498-396-00558		

A8.6.5 Recommended special tools

Description	Application	Picture
Power supply (24 Volt, 5A)	Used when the trolley will not come down from the base	
Belt tension gauge (Range 50-250 Hz, accuracy 2Hz).	Corrective maintenance: belt tension check after Z-motor, Z-belt, X-motor and X-belt replacement.	
Mirror	Adjusting board sensors	

A8.6.6 Recommended Assembléon tools

Description	Ordering Code	Application	
Wrist band ESD	2622-890-98277		
Spiral coard	2622-890-98352		
Adjustment plate	9498-396-00118	Trolley lift	
Plastic feeler gauge	5322-395-10673		
Trolley extension cable	5322-218-11886		
Encoder tester	5322-395-10773		
Y-calibration tool, A-series trolley	9498-396-00857		
Z-calibration tool, A-series trolley	9498-396-00856		
Suspension beam	5322-535-10577		
Suspension bracket	5322-395-10843		
Carrier detection adjustment tool	5322-395-10841		
Adjustment carrier	5322-466-11767		
Adjustment ring 20 mm	5322-532-12917		
Adjustment ring 26 mm	5322-532-12918		
Assy strip	9498-396-00980		
Extension cable 2, A-series trolley	9498-396-00859		
Extension cable 1, A-series trolley	9498-396-00858		
Gauge board Transport	5322-395-10639	Board transport	
Height block	5322-466-11589	Board transport	
Special wrench	5322-395-10638		
Dial gauge holder Z=0	9498-396-00157	Gauge included	
Lift plate feeder bank	4022-532-06401		
X-Y calibration kit	5322-466-11608	Required for XY robot calibration	
Torque meter (5 N)	5322-395-10692	Required for Placement Head	
Torque meter (20N)	5322-395-80388	Required for Placement Head	
Belt tension indicator	5322-395-10704	Required for Service Kit Feeding	

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B6.4 Digital pressure switch, check and adjust settings

B6.4.1 Digital pressure switch, check setting

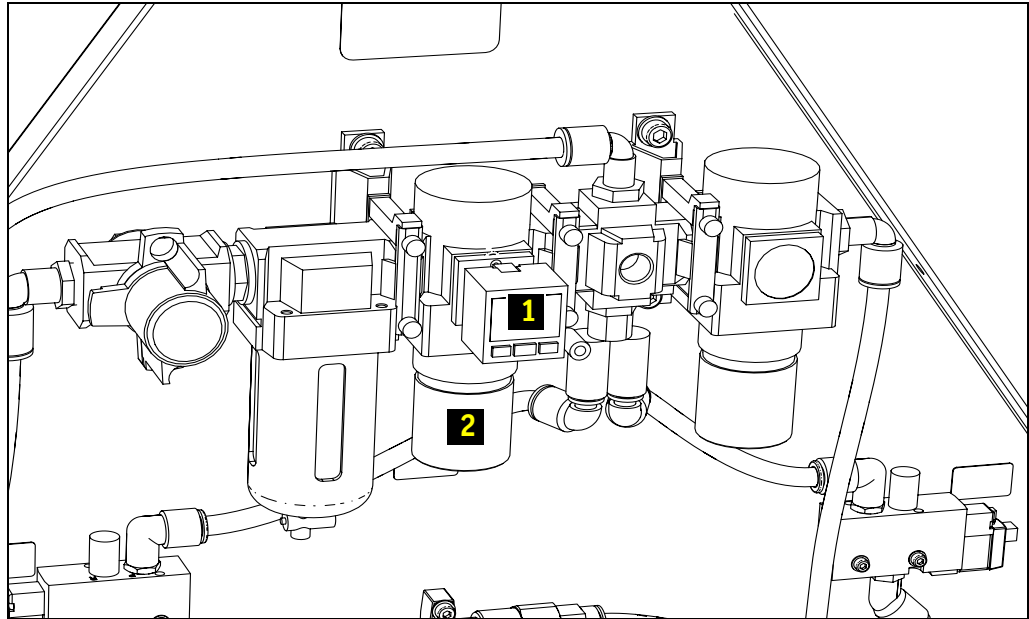


Figure 85 Digital pressure switch and clock gauge

Open the rear left upper door of the base and check the behaviour of the switch by changing the compressed air pressure using the regulator knob (2 in figure 85).

1. Unlock the knob of the regulator (2) by pulling it downwards.
Change the pressure by turning it.
2. Increase the pressure to approximately 6.9 bar (1) and verify that the indicator on the display turns RED at 6.4 bar (1).
3. Reduce the pressure to approximately 4 bar (1) and verify that the indicator on the display is RED.
4. Increase the pressure back to 5.9 bar (1) and verify that the indicator on the display changes to GREEN at 5.4 bar (1) and stays GREEN at 5.9 bar (1).
5. Lock the knob of the regulator (2) by pushing it upwards.
 - When the behaviour of the digital pressure switch is OK, the settings are correct.
 - When the behaviour of the switch is NOK, the settings have to adjusted. Use the 'Adjust settings' procedure below.

B6-00004.fm

B6.4.2 Digital pressure switch, adjust settings

B6.4.2.1 Digital pressure switch in 'measure' mode, unlocking or locking

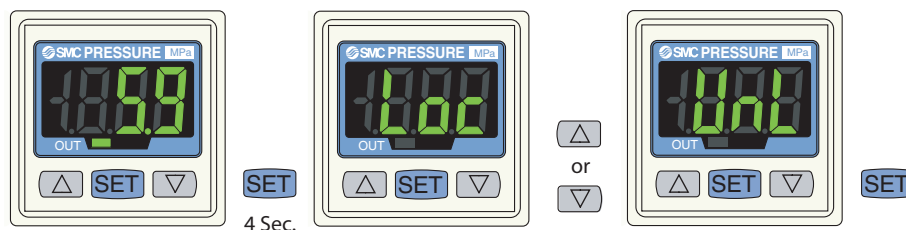


Figure 86 Digital pressure switch, unlocking or locking

- Press 'SET' for more than 4 seconds until the display shows 'UnL' (unlocked) or 'Loc' (locked).
- Press the ▲ or ▼ button to select the desired status: 'UnL' or 'Loc'.
- Press the 'SET' button.

B6.4.2.2 Digital pressure switch in 'initial set' mode, adjustment

In this mode the output type, response time and display colour can be changed.

Press 'SET' for more than 2 seconds until bAr, Psi, PA or GF is displayed.

The display is set from 'measure' mode to 'initial set' mode.

1. Unit conversion setting:

- Press the ▲ or ▼ button till 'bAr' is visible on the display.
- Press the 'SET' button again.

2. Display colour setting:

- Press the ▲ or ▼ button till 'SoG' is visible on the display.
- Press the 'SET' button again.

3. Operating mode setting:

- Press the ▲ or ▼ button till 'HYS' is visible on the display.
- Press the 'SET' button again.

4. Output type setting:

- Press the ▲ or ▼ button till 'nC' is visible on the display.
- Press the 'SET' button again.

5. Response time setting:

- Press the ▲ or ▼ button till '160' is visible on the display.
- Press the 'SET' button again.

6. Manual or automatic setting:

- Press the ▲ or ▼ button till 'mAn' is visible on the display.
- Press the 'SET' button again.

The display returns from Initial set mode to Measure mode.

B6.4.2.3 Digital pressure switch in 'pressure set' mode, adjustment

In this mode the set values for switch points can be changed.

Press 'SET' (less than 2 seconds) Display goes from 'measure' mode to 'pressure set' mode.

Alternatively 'P_1' and a value is visible in the display.

1. Set the value to '5.50', see [B6.4.2.4. Digital pressure switch, setting a value.](#)
2. Press the 'SET' button.

Alternatively 'H' and a value, is visible in the display.

3. Set the value to '0.00', see [B6.4.2.4. Digital pressure switch, setting a value.](#)
4. Press the 'SET' button.

The display returns from 'pressure set' mode to 'measure' mode.

5. Lock the display, see [B6.4.2.1. Digital pressure switch in 'measure' mode, unlocking or locking.](#)

B6.4.2.4 Digital pressure switch, setting a value

The digital pressure switch must be in 'pressure set' mode, see [B6.4.2.3.](#)

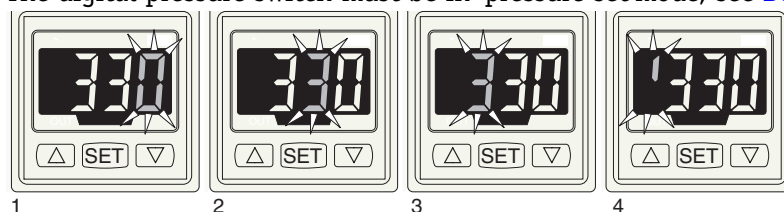


Figure 87 Digital pressure switch, setting a value

1. Press the ▲ or ▼ button to change the set value. The first digit blinks. Press the ▲ or ▼ button to set the value arbitrarily.
2. With every push on the 'SET' button, the next digit blinks.
3. With every push on the 'SET' button, the next digit blinks.
4. When the left-most digit is zero, 'I' or 'L' will blink. If the 'SET' button is pressed while the left-most digit is blinking, the right-most digit will now blink.

B6.4.2.5 Digital pressure switch, accuracy check

During normal operation (measuring mode) the digital pressure switch (1) must show roughly the same pressure as the clock gauge (2) ± 0.5 bar.

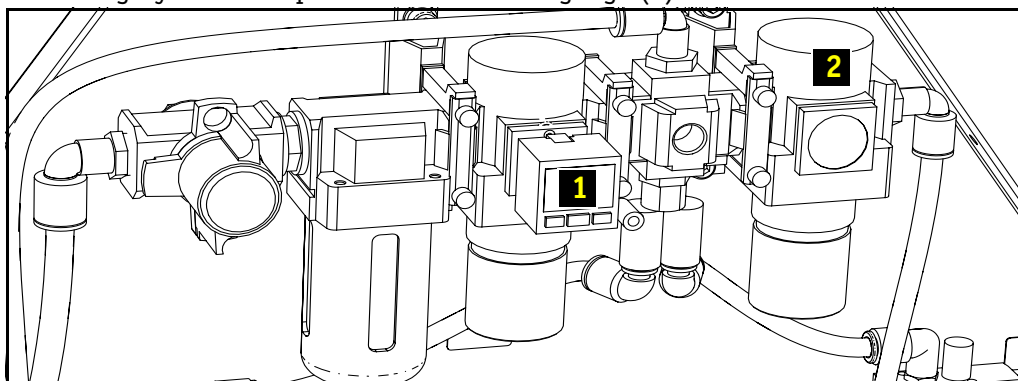


Figure 88 Digital pressure switch and clock gauge

If there is a difference, the digital pressure switch can be reset, see [chapter B6.4.2.6 "Digital pressure switch, reset the pressure registration"](#).

B6-00004.fm

B6.4.2.6 Digital pressure switch, reset the pressure registration

The digital pressure switch can be reset if there is no system pressure.

- Unlock the digital pressure switch, see [B6.4.2.1. Digital pressure switch in 'measure' mode, unlocking or locking](#)
- Press the ▲ or ▼ button simultaneously till the value on the display is set to zero.

B6.4.2.7 Digital pressure switch, peak/bottom display

After unlocking the digital pressure switch, the measured min. or max. pressure can be held on the display.

- Activating peak/bottom display.
Keep the ▲ or ▼ button pressed more than 1 sec. The display shows the min. or max. pressure flashing.
- De-activating peak/bottom display.
Keep the ▲ or ▼ button pressed more than 1 sec.

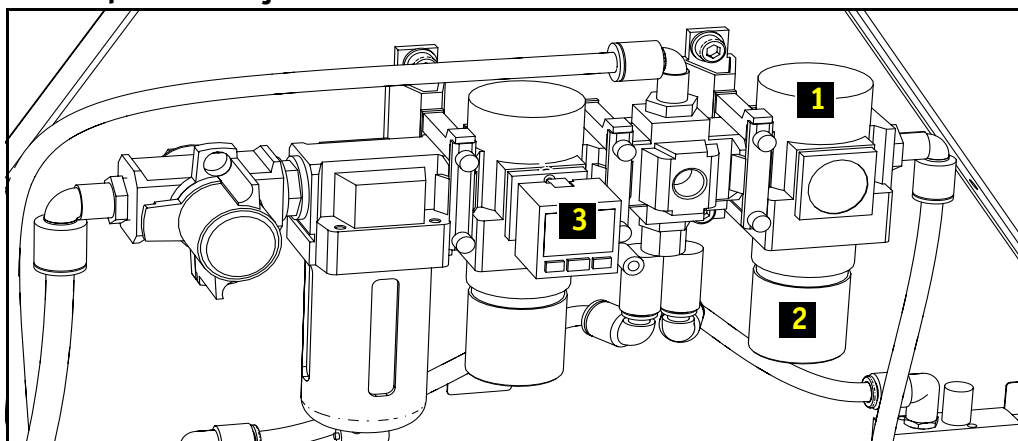
B6.4.2.8 Blower pressure adjustment

Figure 89 Blower pressure adjustment

Check if system pressure (3) is available (5.9 Bar).

Turn the knob (2) to 2.5 Bar (1).

B6.4.3 Digital vacuum switch (ZSE30-01-65), setting procedure

For installing the digital pressure gauge on the system the following setting procedure should be followed.

1. Unlock the system
 - Press the SET button for more than 4 seconds until **UnL** (unlock mode) or **Loc** (lock mode) is visible on the display
 - Press the ▲ or ▼ button until **UnL** is visible on the display.
 - Press the SET button.
(The system is unlocked).
2. Initial settings
 - Press the SET button for more than 2 seconds.
bAr, PSi, inH, nnH, PA or GF becomes visible on the display
(the system has gone from the *Measure mode* into the *Initial set mode*)
 - Press the ▲ or ▼ button until **bAr** is visible on the display.
(Unit Bar is selected)
 - Press the SET button.
Sor, SoG, rEd or Grn becomes visible on the display.
 - Press the ▲ or ▼ button until **SoG** is visible on the display.
(Green/ON is selected)
 - Press the SET button
HYS or wnd becomes visible on the display
 - Press the ▲ or ▼ button until **HYS** is visible on the display.
(Hysteresis operation mode is selected)
 - Press the SET button.
no or nC becomes visible on the display.
 - Press the ▲ or ▼ button until **nC** is visible on the display.
(Normally open output mode is selected)
 - Press the SET button.
2.5, 20, 160, 640 or 1280 becomes visible on the display
 - Press the ▲ or ▼ button until **160** is visible on the display.
(Response time of 160 ms is selected)
 - Press the SET button.
AUt or mAn becomes visible on the display
 - Press the ▲ or ▼ button until **mAn** is visible on the display.
(Manual set mode is selected)
 - Press the SET button.
(The system has switched from the *Initial set mode* into the *Measure mode*).
3. Pressure settings
 - Press the SET button.
Alternatively **n_1** and a value is visible on the display.
(The system has gone from the *Measure mode* into the *Pressure set mode*).
 - Press the ▲ or ▼ button until **-.750** is visible on the display.
The value will increase or decrease one digit per push on the button. The value will increase or decrease continually while keeping the button pushed.
(Upper pressure set point of -0.75 Bar for output 1 is selected)
 - Press the SET button.
Alternatively **H** and a value is visible on the display
 - Press the ▲ or ▼ button until **.000** is visible on the display.
(Hysteresis set for .000 Bar is selected)

B6-00004.fm

4. Lock the system

- Press the Set button for more than 4 seconds until **UnL** (unlock mode) is visible on the display.
- Press the ▲ or ▼ button until **LoC** (lock mode) is visible on the display
- Press the SET button.
(The system is locked against accidental operator actions).



NOTE: In the *Measuring mode* while the system is still unlocked and the operator presses ▲ or ▼ button for more than 1 second, the system switches to the *Peak* or *Bottom display mode*. In these modes the max. or min. pressure value will be held on a flashing display. To switch back to *Measure mode*, press the ▲ or ▼ button for more than 1 second once more.

C6.1 Transport, release width or lift brake manually

Estimated time to complete [min.]: -

Required special tools. Power supply (24 Volt, 5A), see
[A8.6.5 Recommended special tools](#)

Required part(s) -

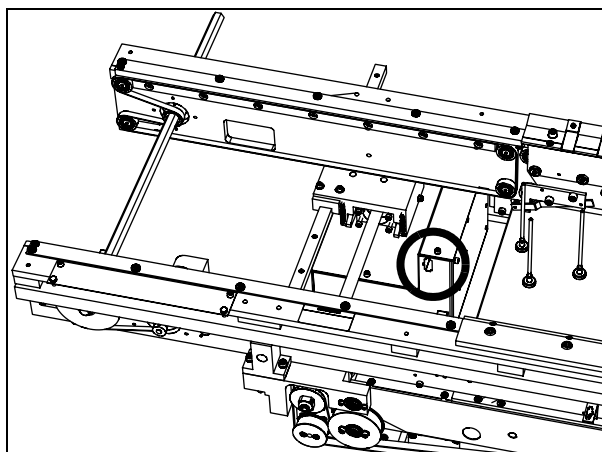


NOTE: Use TIP tools ([A5.1.3 TIP tools](#)), otherwise a 24V power supply is required.

1. Release transport width brake

- Disconnect connector X1.
- Apply 24V between pin 1 and 3 on the connector, pin 1 positive.

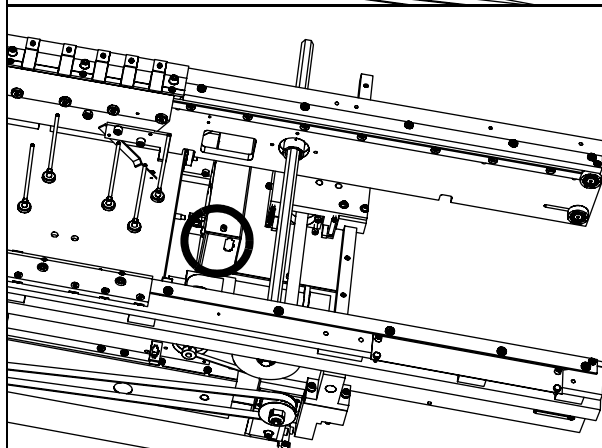
Note: The brake can also be released using TIP tools.



2. Release transport lift brake

- Disconnect connector X1.
- Apply 24V between pin 1 and 3 on the connector, pin 1 positive.

Note: The brake can also be released using TIP tools.



C6-00001.fm

C6.2 Transport width belt, check/adjust tension

Estimated time to complete [min.]: 5/5 (checking/adjusting)

Required special tools. Belt tension indicator,
see [A8.6.6 Recommended Assembléon tools](#)

Required part(s) -

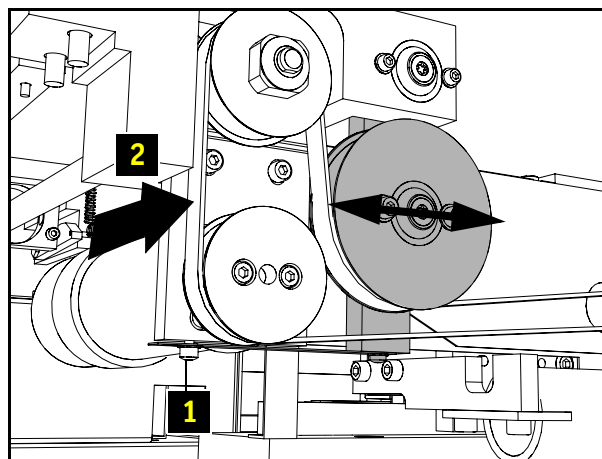
1. Check the belt tension

- Check the belt tension at location 2:
375 ± 40 Hz.

2. Adjust the belt tension

Always use a belt tension indicator to avoid damage to the transport width motor!

- Loosen the bolt (1) to change position of gear bracket.
- Tighten the bolt (1).
- Re-check belt tension at location 2.



C6.3 Transport drive belt, check/adjust tension

Estimated time to complete [min.]: 5/5 (checking/adjusting)

Required special tools. Belt tension indicator,
see [A8.6.6 Recommended Assembléon tools](#)

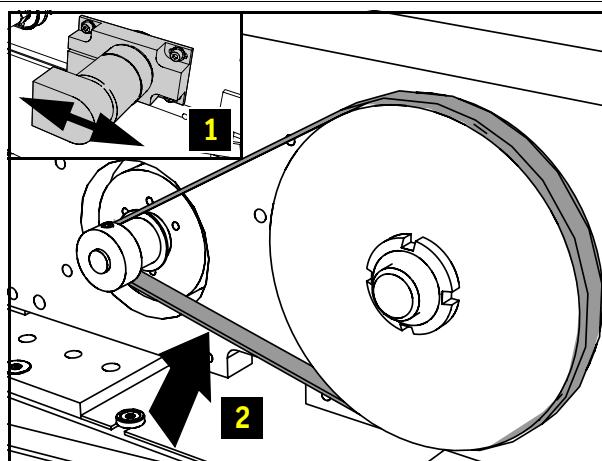
Required part(s) -

1. Check the belt tension

- Check the belt tension at location 2:
100 ± 40 Hz.

2. Adjust the belt tension

- Loosen three screws of drive belt motor bracket (1).
- Change position of drive belt motor bracket.
- Tighten three screws of drive belt motor bracket (1).
- Re-check belt tension at location 2.



C6-00012.fm

C6.4 Transport lift belt, check/adjust tension

Estimated time to complete [min.]: 5/5 (checking/adjusting)

Required special tools. Belt tension indicator,
see [A8.6.6 Recommended Assembléon tools](#)

Required part(s) -



NOTE: Use TIP tools ([A5.1.3 TIP tools](#)), otherwise a 24V power supply is required.

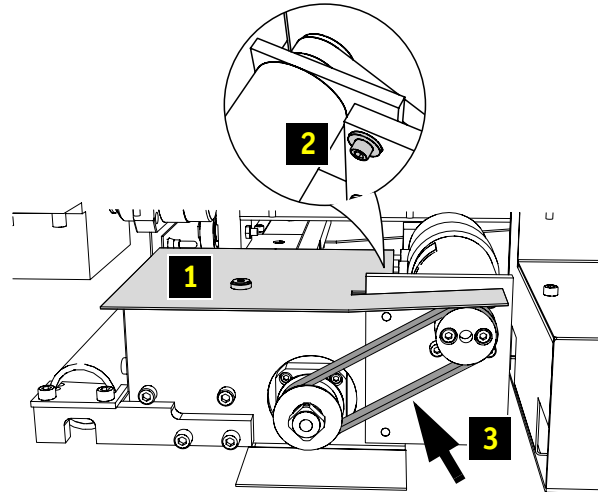
1. Check belt tension

- Release the transport lift brake, using TIP tools, or see [C6.1 Transport, release width or lift brake manually](#)
- Check the belt tension at location 3:
140 ± 40 Hz.

2. Adjust the belt tension

Always use a belt tension indicator to avoid damage to the lift motor!

- Remove cover (1).
- Loosen screw of transport lift motor bracket (2).
- Change position of transport lift motor bracket.
- Re-check belt tension at location 3.
- Install cover (1).



C6.6 Transport lift table, levelling

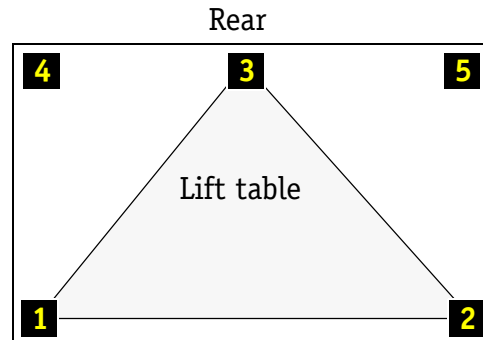
Estimated time to complete [min.]: 45

Required special tools: Height block, dial gauge with support, [A8.6.6 Recommended Assembléon tools](#)

Required part(s) -

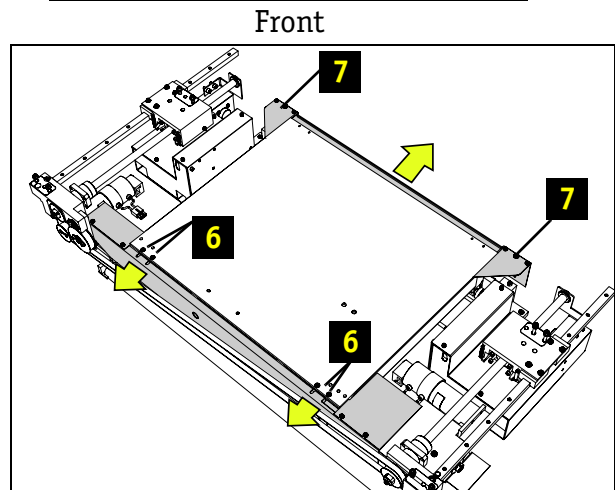
1. Prerequisites

- Release the transport lift brake, use TIP tools [A5.1.3 TIP tools](#) or see [C6.1 Transport, release width or lift brake manually](#) .



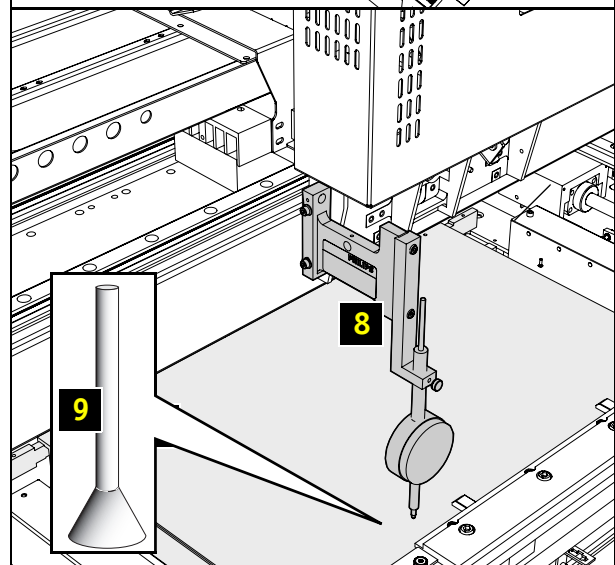
2. Remove covers of lift table

- Loosen four screws at the front (6) and slide transport security plate to the front.
- Remove two screws (7) and take rear security plate out.
- Raise the lift table to its upper position (minus approx. 2 mm).



3. Position dial gauge with support

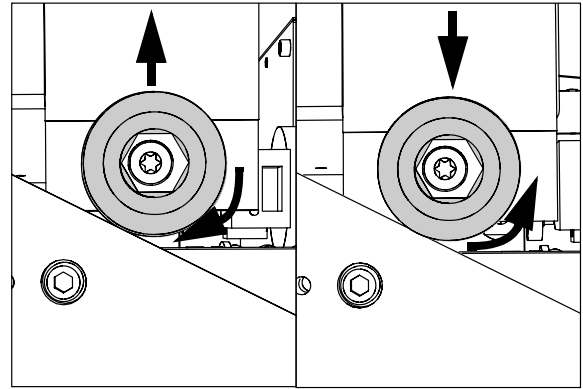
- Mount dial gauge according picture (8).
- Place the height block (9) on the lift table above an eccentric bearing (position 1).



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4. Check and adjust levelling of lift table

- Check if the eccentric bearing at the rear (3) is in its middle position.
- Stroke of the bearing is 0.5 mm
- Bring the dial gauge over the height block and note the value (H1).
- Repeat the procedure for a second eccentric bearing (position 2), note the value (H2).
- Repeat the procedure for the third eccentric bearing (position 3), note the value (H3).
- Check the level, $H1 = H2 = H3 (\pm 0.1 \text{ mm})$.
- If the support plate unit is not level at these points:
- Take point 3 as a reference point.
- Using a torque screwdriver, release the locking screws of the eccentric bearings.
- Adjust level of support plate unit until $H1 = H2 = H3 (\pm 0.1 \text{ mm})$.
- Tighten the locking screws and re-check the values.

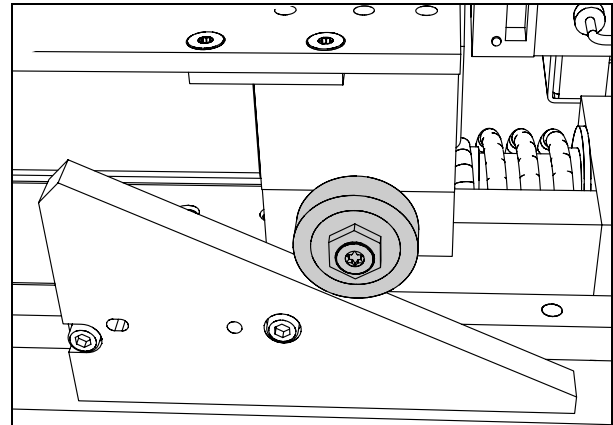


5. Checking lift table corners (H4,H5)

- Place the height block on each corner of the lift table.
- Bring the dial gauge over the height block and check the level, $H1 = H2 = H4 = H5 (\pm 0.1 \text{ mm})$.

If the support plate unit is not level at these points:

- Using a torque screwdriver, release the locking screws of the eccentric bearings.
- Adjust level of support plate unit until $H1 = H2 = H4 = H5 (\pm 0.1 \text{ mm})$. Tighten the locking screws and re-check the values.



6. Finalize

- Remove dial gauge and height block.
- Mount covers.

C6.7 Board clamps, adjustment

Estimated time to complete [min.]: 20

Required special tools. -

Required part(s) -



NOTE: Use TIP tools ([A5.1.3 TIP tools](#)), otherwise a 24V power supply is required.

1. Prerequisites

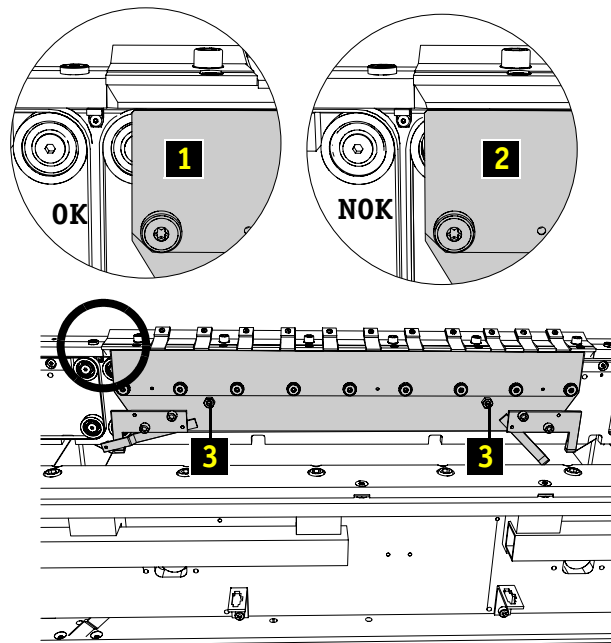
- Lower the lift table, release the transport lift brake, using TIP tools [A5.1.3 TIP tools](#), or see [C6.1 Transport, release width or lift brake manually](#)

2. Adjust the rear board clamp in X-direction

- Check that the rear board clamp covers half of the WA conveyor belt (1) and does not exceed the first bearing (2).

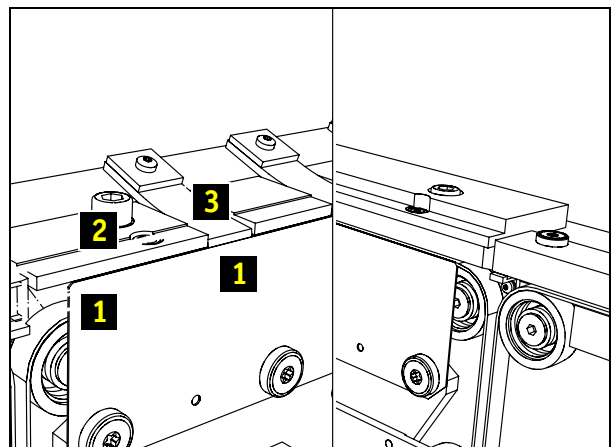
If the clamping strip position is incorrect:

- Loosen the two lock nuts (3) of the eccentric adjustment screws.
- Move the rear board clamp to the correct position using the adjustment screws and tighten the two lock nuts (1).



3. Adjust the board clamps in Z-direction

- Raise the lift table.
- Measure the distance between the rear board clamp (1) and the clamping bar (2) at the front edge (0 mm).
- Measure the distance between the rear board clamp (1) and between the plastic springs (3) at the rear edge (0 mm).
- If the distances are not correct check the height adjustment of the transport rails, see [C6.6 Transport lift table, levelling](#)
- Repeat the procedure.

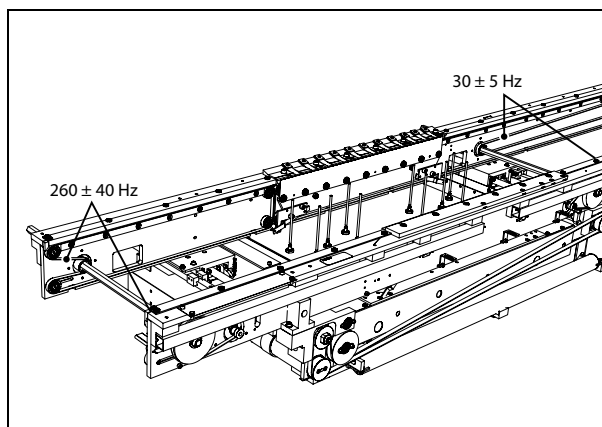


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C6.8 Transport belts, check/adjust tension

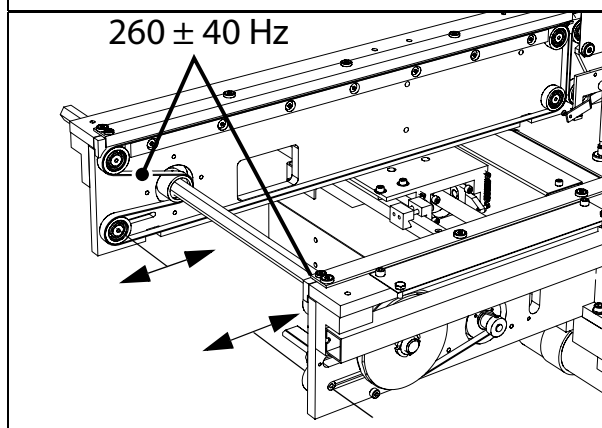
Estimated time to complete [min.]:	5/5 (checking/adjusting)
Required special tools.	Belt tension indicator, see A8.6.6 Recommended Assembléon tools
Required part(s)	-

1. Check tension of transport belts



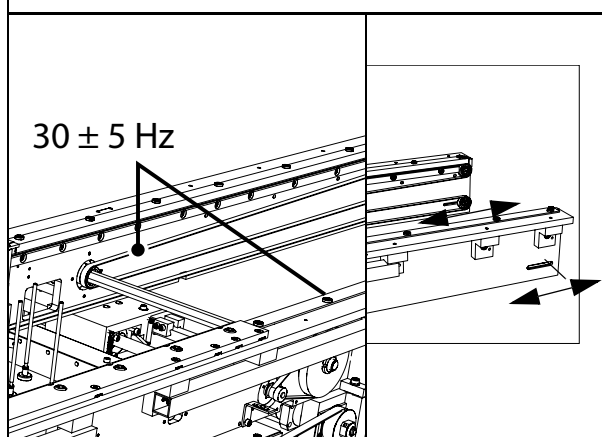
2. Adjust transport belts in run-in area

- Release lower left bearing wheel on rail.
- Apply lateral pressure to the bearing wheel to increase or decrease belt tension as required.
260 ± 40 Hz
- Secure bearing wheel and re-check belt tension.



3. Adjust transport belts in work area

- Release lower right bearing wheel on rail.
- Apply lateral pressure to the bearing wheel to increase or decrease belt tension as required.
30 ± 5 Hz
- Secure bearing wheel and re-check belt tension.



C6-00007.fm

C6.9 Transport rails, parallelism adjustment

Estimated time to complete [min.]: 20

Required special tools. Gauge board transport, [A8.6.6 Recommended Assembléon tools](#)

Required part(s) -

1. Prerequisites

- Release the transport width brake, see [C6.1 Transport, release width or lift brake manually](#)

2. Position dial gauge with support

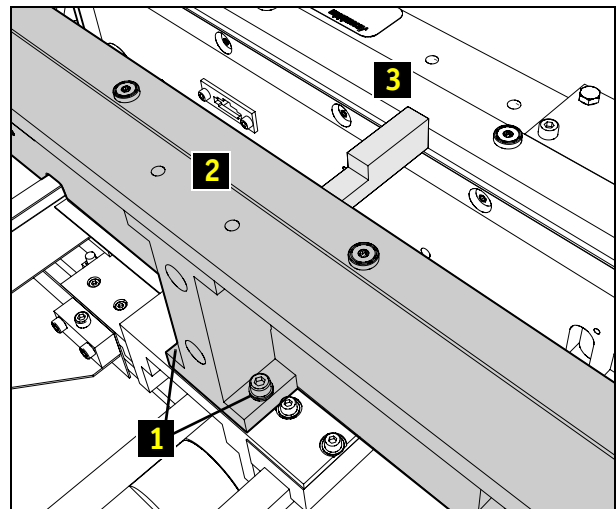
- To be defined.

3. Adjustment

- Move the rear transport rail (2) against the front transport rail.
- Loosen the four screws (1) screws of the rear transport rail.
- Place the gauge board transport blocks (3, $49 \pm 0.1\text{mm}$) above the spindles.
- Push the rear transport rail (2) against the adjustment blocks (3).
- Tighten the screws (1) of the rear transport rail.
- Remove the adjustment blocks (3).

4. Check

- Check the transport width over the whole transport area. Tolerance is 0.1 mm.
- Check height adjustment.



C6.12 Transport width, parallelism adjustment

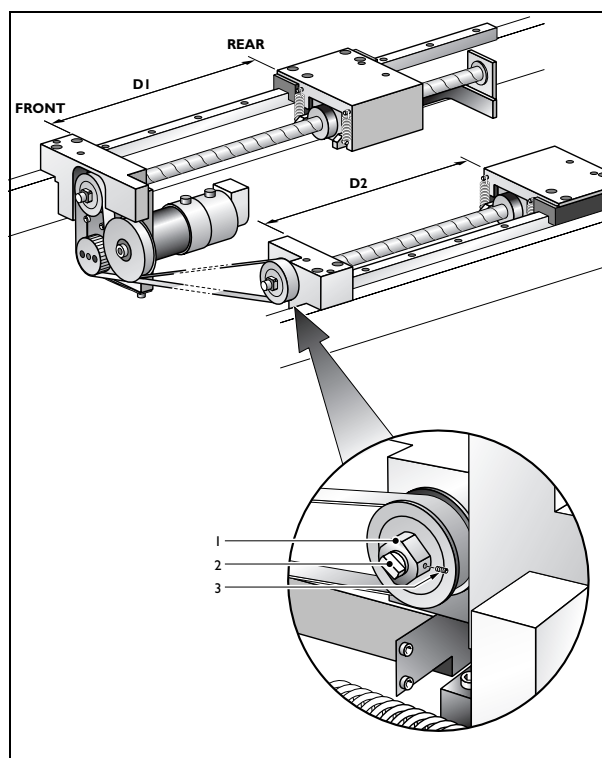
Estimated time to complete [min.]: 20
Required special tools. Feeler gauges
Required part(s)

1. Prerequisites

- Release the transport width brake, see [C6.1 Transport, release width or lift brake manually](#)

2. Adjust parallelism

- Close the distance between the front and rear width adjustment guide blocks until they are as close as possible.
- Measure the distance (with feeler gauges) between the guide blocks at 'D1' and compare it with the distance between the guide blocks at 'D2'.
- If the difference at 'D1' is not between 0.05 and 0.2 mm:
 - * Loosen grub screw (3) and locking nut (1) on the shaft.
 - * Turn the shaft (2) until the difference between 'D1' and 'D2' is between 0.05 and 0.2 mm.
 - * Tighten the locking nut, grub screw and re-check distance D1 and D2.



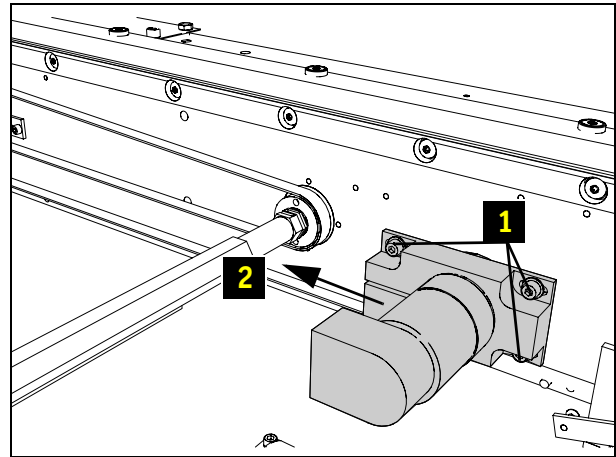
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C8.2 Transport drive belts, replacement

Estimated time to complete [min.]: 30 (sub tasks included)
 Required special tools. Belt tension gauge, see [A8.6.5 Recommended special tools](#)
 Required part(s) [A8.4.7 Board transport, spares](#)

1. Remove the transport drive belt

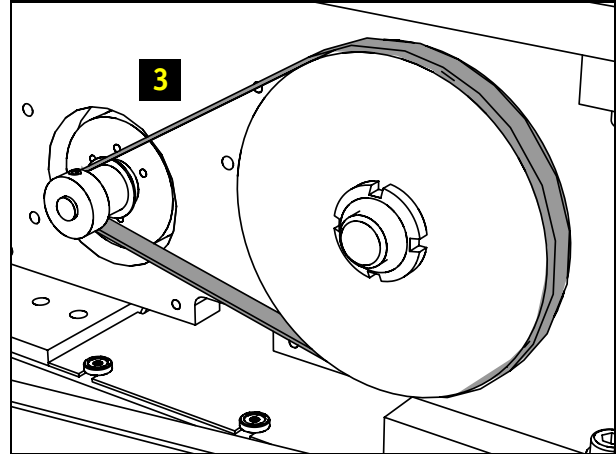
- Loosen the three bolts (1).
- Slacken the board transport drive belt tension by sliding the motor bracket (2).
- Remove the drive belt (3).



2. Install the transport drive belt

3. Finalize

- Adjust the belt tension, [C6.3 Transport drive belt, check/adjust tension](#)



C8.3 Transport belts, replacement

Estimated time to complete [min.]: 20 (sub tasks included)
Required special tools. Belt tension gauge, see [A8.6.5 Recommended special tools](#)
Required part(s) [A8.4.7 Board transport, spares](#)

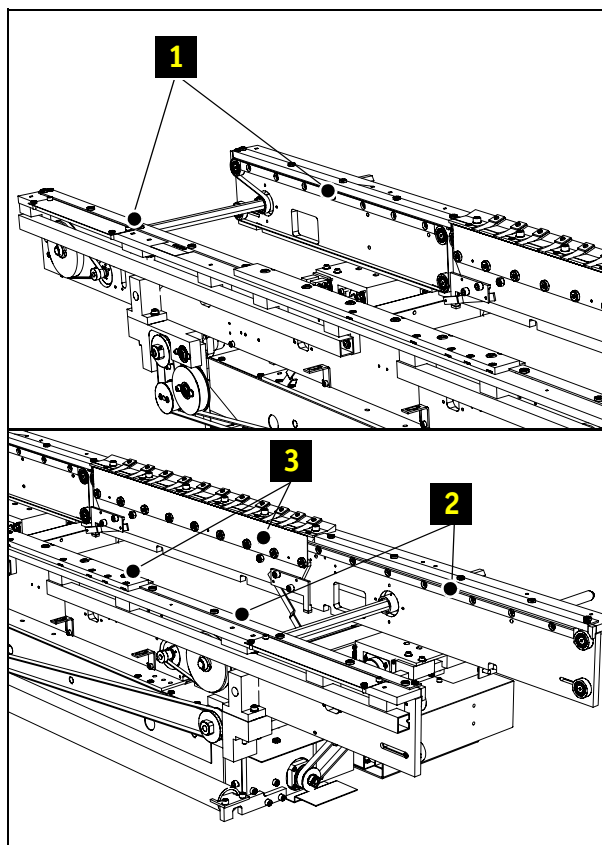
1. Replacing the transport belts in the run-in area (1)

Note: Run-in belts can be replaced without disassembling any part.

- Adjust and check belt tension, see [C6.8 Transport belts, check/adjust tension](#) .

2. Replacing the transport belts in the work area (2)

- Remove the board clamps (3).
- Replace the transport belts.
- Adjust and check the belt tension, see [C6.8 Transport belts, check/adjust tension](#)
- Adjust the board clamps, see [C6.7 Board clamps, adjustment](#) .



C8-00017.fm

C8.7 Transport lift belt, replacement

Estimated time to complete [min.]: 30

Required special tools. -

Required part(s) [A8.4.7 Board transport, spares](#)

1. Prerequisites

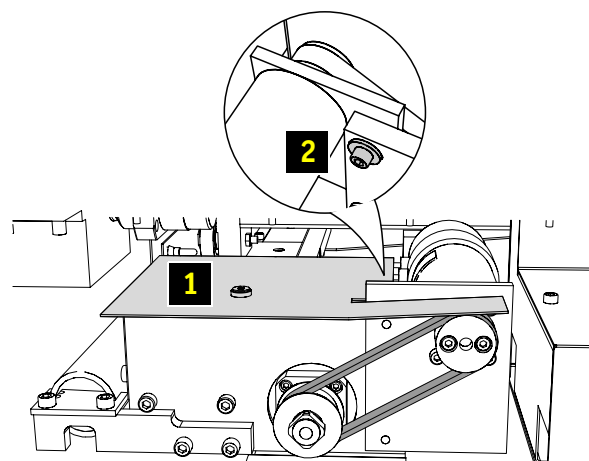
- Set transport to maximum width.
- Set lift table in up position.
- Power down machine.

2. Replace transport lift belt

- Remove the cover plate (1).
- Slacken belt tension (2).
- Replace transport lift belt.

3. Finalize

- Adjust and check the transport lift belt tension, see [C6.4 Transport lift belt, check/adjust tension](#)
- Adjust zero course and zero fine, see [A5.1.3 TIP tools](#)



C8-00006.fm

C8.17 Transport width belt, replacement

Estimated time to complete [min.]: 20

Required special tools. -

Required part(s) [A8.4.7 Board transport, spares](#)

1. Prerequisites

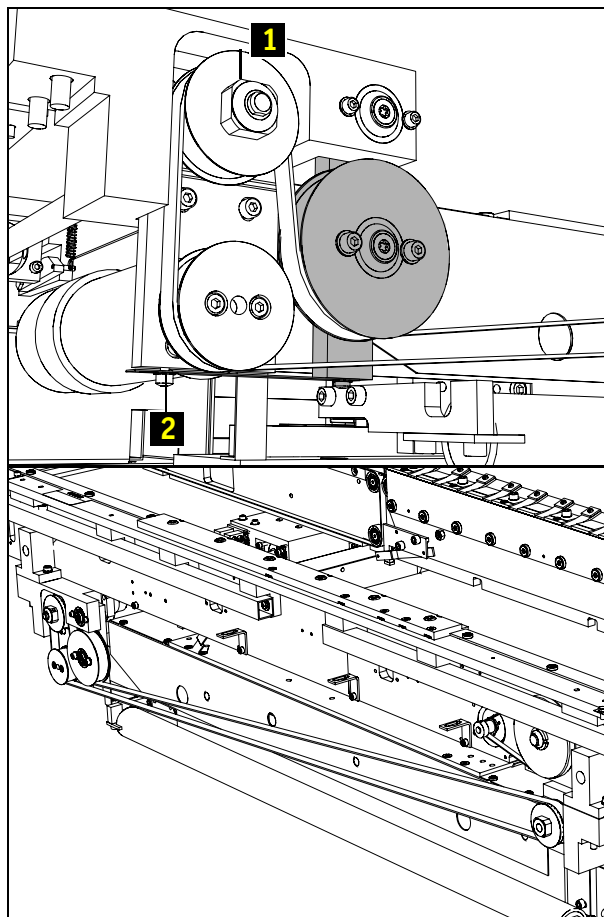
- Mark the position of both gears (1) left and right.

2. Replace the transport width belt

- Slacken transport width belt (1).
- Remove the belt.
- Check if both marked gears are still in the same position (2)
- Mount the new belt.
- Adjust the transport width belt, see [C6.2 Transport width belt, check/adjust tension](#)

3. Finalize

- Check zero fine/zero coarse adjustment.
Use Tip tools, see [A5.1.3 TIP tools](#) .
- Check parallelism of transport rails,
see [C6.9 Transport rails, parallelism adjustment](#)
and [C6.12 Transport width, parallelism adjustment](#)
- Check if the zero coarse/zero fine distance is
between 500 and 1500 increments.



D6.1 Placement head HA, measuring friction of the RZ movement

Estimated time to complete [min.]: 15
Required special tools: Torque meter 0-5 Nm
Required part(s) -

1. Measure friction of the RZ drive, 1

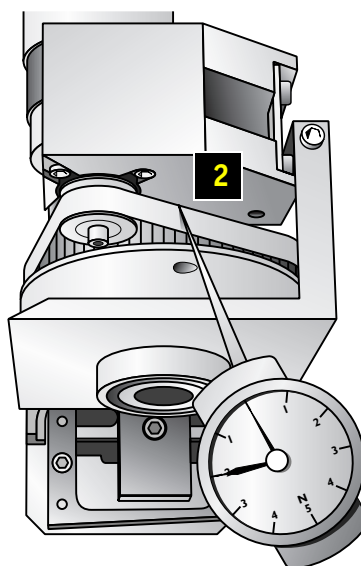
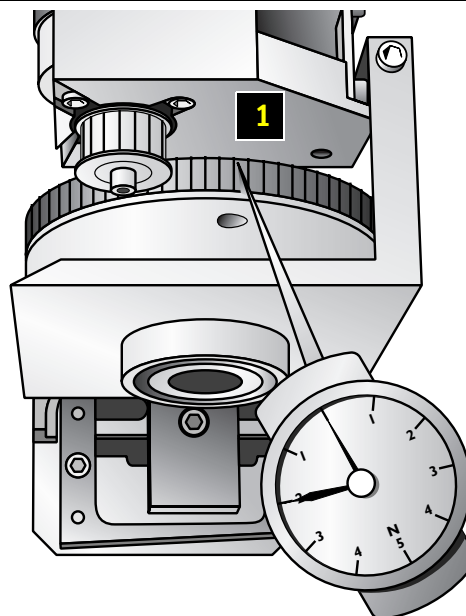
- Disconnect the RZ motor connection X1 at the interconnection board;
- Remove the drive belt;
- Hold the torque meter (5 N) against the edge of a tooth on the force control unit drive gear and measure the friction of the RZ drive (0.8 N).
- If not OK, see [D7.9 Placement head HA, checking, cleaning and lubricating](#)

2. Measure tension of the RZ drive, 2

- Install the belt and repeat measurement on the belt (2 N).

3. Finalize

- Re-connect the RZ motor connection X1 at interconnection board.



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D6.2 Placement head HA, measuring friction of the Z movement

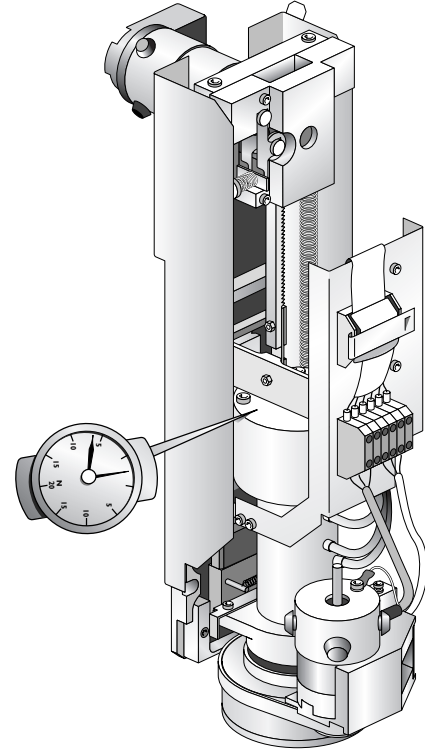
Estimated time to complete [min.]: 5
 Required special tools. Torque meter 0-20 Nm
 Required part(s)

1. Measure friction

- Disconnect the Z motor connection X7 at the manifold board.
- Remove the top screws of the tension springs.
- Hold the torque meter (20 N) against the top and bottom of the RZ bearing housing and measure the friction of the Z movement as follows:

$$Z_{friction} = \frac{UP_{movement}(-DOWN_{movement})}{2}$$

- Press the modified screwdriver into the top of the right spring and move the spring to its working position.
- Secure the spring using the top screw.
- Use the threaded end to bring the left spring into its working position, press the modified screwdriver into the spring to keep it in position.
- Remove the threaded end and secure the spring using the top screw.
- Re-connect the Z motor connection X7 at the manifold board.
- If not OK, see [D7.9 Placement head HA, checking, cleaning and lubricating](#)



D6-00003.fm

D8.2 Placement head DV, head replacement

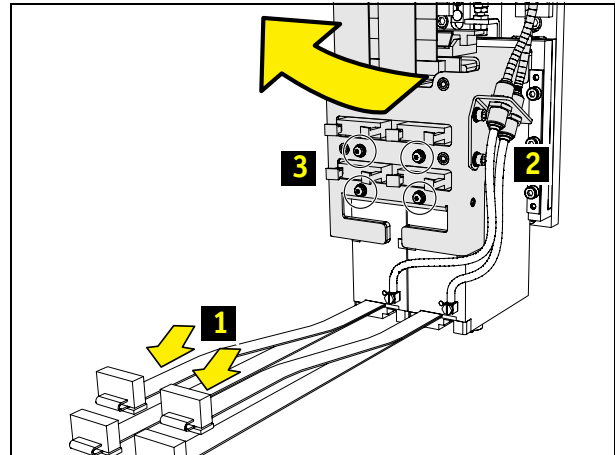
Estimated time to complete [min.]: 30

Required special tools: -

Required part(s) [A8.4.10 Placement head DV, spares](#)

1. Prerequisites

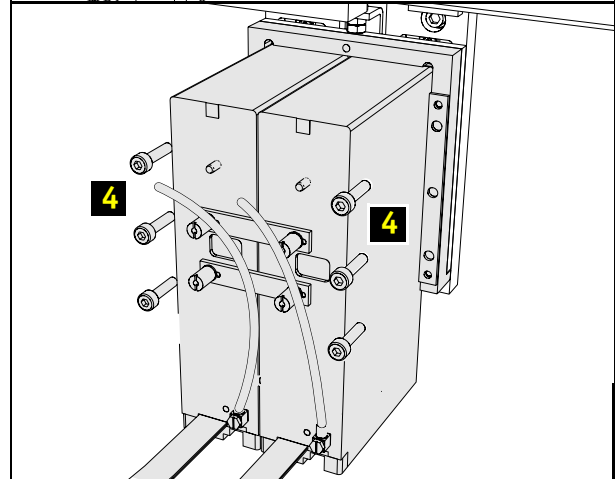
- Power down the machine.
- Disconnect the four flat cables (1).
- Disconnect the two air hoses (2).
- Remove the four screws (3) and put the bracket aside.



2. Remove placement head DV

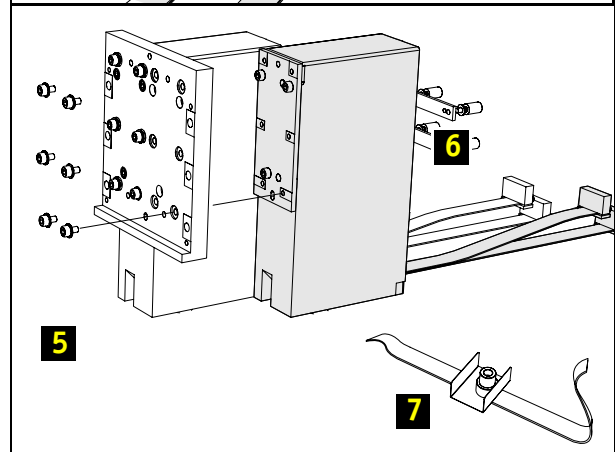
Note: Hold the placement head while removing the last bolt.

- Remove the six bolts (4).
- Pull the placement head from the dowel pins.



3. Transfer placement head

- Remove both brackets (6).
- Remove the six bolts (5) of the placement head concerned.
- Pull the placement head from the dowel pins.
- Transfer transport strap (7) from new to old placement head DV.



4. Finalize

- Assembly in reverse order.
- Tightening torque placement head bolts (5) 1.3 Nm, mounting bolts (4) 3.5 Nm.
- [A6.1.1 Exchange calibration procedure](#)

D8-00006.fm

D8.8 Placement head HA, RZ belt replacement

Estimated time to complete [min.]: -
Required special tools: Feeler gauges
Required part(s) Belt, [A8.4.8 Placement head HA, spares](#)

1. Dismantling

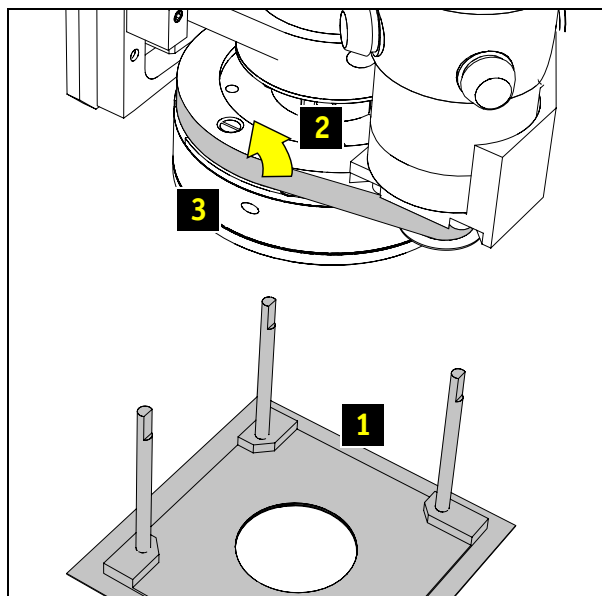
- Loosen the three screws and remove the blue plate (1).

2. Replace the RZ belt

- Turn the force control unit (3) and push the RZ belt in an upwards direction (2) at the same time.
- Move the placement head in its lowest position and remove the RZ belt.

3. Finalize

- Assembly is in the reverse order of removal.
- Check the belt tension, see [D6.1 Placement head HA, measuring friction of the RZ movement](#)
- The blue plate (1) must be installed with a play of 0.5 ± 0.3 mm between blue plate (1) and force control unit (3).



D8-00016.fm

G8.8 Fans on Y-axis, replacement

Estimated time to complete [min.]: 30

Required special tools. -

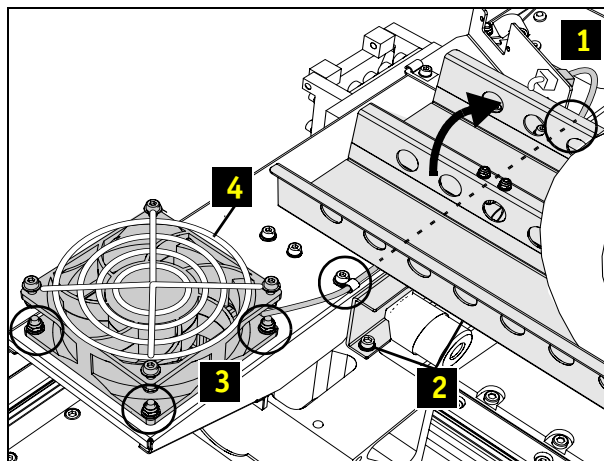
Required part(s) Loctite 243 [A8.4.12 XY robot, spares](#)

1. Prerequisites

- Remove the trolleys.
- Power down the machine.
- Note the position of fan cable and tie wraps.

2. Replace the fan

- Disconnect wiring (1) and release the cable from the air duct (two clamps).
- Loosen the two bolts (2) and remove wiring underneath the cable guide.
- Remove the four bolts and take the fan (3) out.
- Transfer the finger guard (4).
- Clean the area with a vacuum cleaner.
- Assembly in reverse order.
- Apply Loctite 243 to all mounting bolts.



G8.9 Fans on X-axis, replacement

Estimated time to complete [min.]: -
 Required special tools. Loctite 243
 Required part(s) A8.4.12 XY robot, spares

1. Prerequisites

Note: Perform this procedure at the side with the placement heads HA.

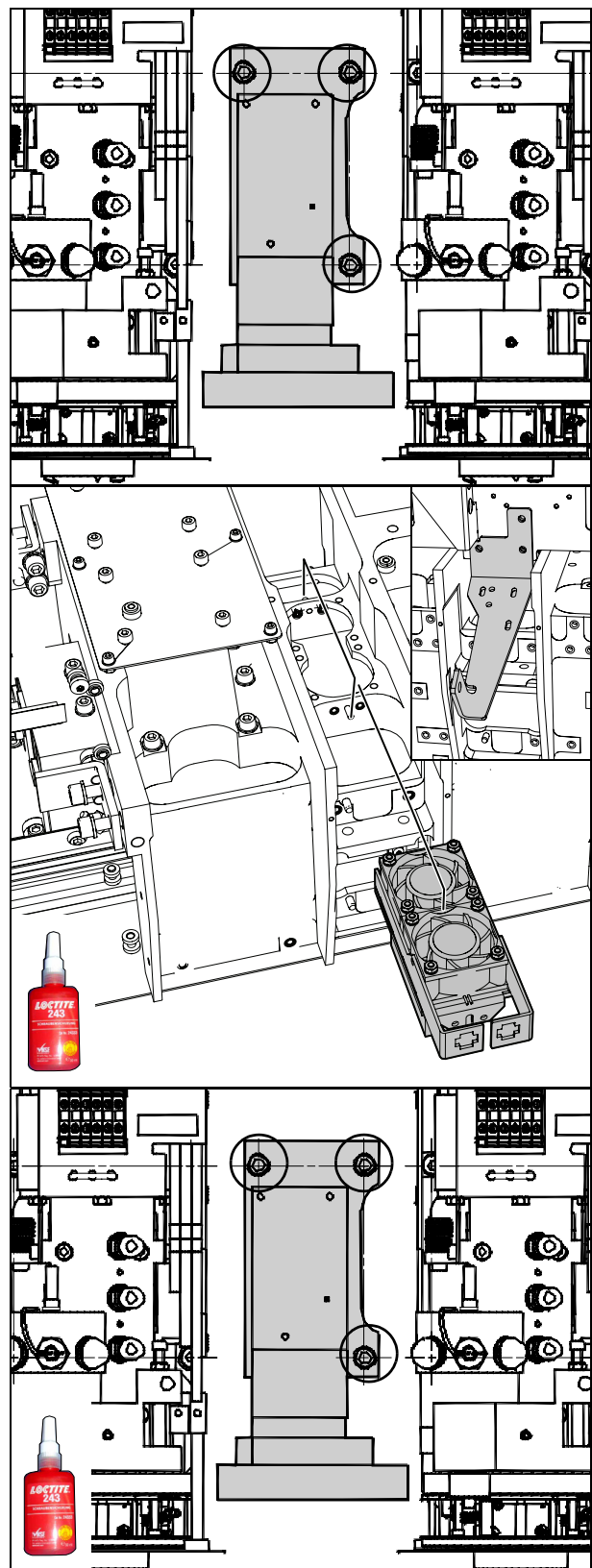
- Remove the trolleys.
- Power down the machine.
- Remove the BA camera **with** bracket.
- Note the position of fan cable and tie wraps.

2. Replace bracket with the fans

- Remove the BA camera cable bracket to gain better access to the fans.
- Disconnect the fan connector.
- Loosen the 2 bolts that secure the fan bracket.
- Lift the bracket with the fans and slide it backwards.
- Replace racket with fans.
- Apply Loctite 243 to the mounting bolts.

3. Mount BA camera with bracket

- Press the BA camera downwards when tightening.
- Apply Loctite 243 to mounting bolts.
- Tightening torque 6 Nm.
- Perform an exchange calibration of the BA camera, see [A6.1.1 Exchange calibration procedure](#) .



G8-00013.fm

MODULE 2. SAFETY

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 - A5.1.3.4 Placement head HA, testing via TIP tools
 - A5.1.3.5 Tray trolley, testing via TIP tools
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CHAPTER A2 Safety

A2.1 General

For the correct and safe use of this machine, it is essential that all personnel should follow the safety procedures specified in this manual.

All manuals have danger, warning and cautionary statements where applicable.

Danger, warning and cautionary statements and / or symbols are present on the machine where applicable.

A2.2 Personnel qualification

Operation, adjustment, maintenance and repair of this machine shall be carried out by **qualified and trained** personnel only.

The following training levels are defined:

- Operator level.
- User or supervisor level.
- Maintenance or service level.



NOTE: For each level an official Assembléon training is available.

A2.3 Basic safety rules

- Do not use the machine in an environment where flammable gasses are present or where it is extremely dirty.
- When any personal protection equipment (PPE) is mentioned, it should be used in accordance with the manufacturers instructions.
- Do not defeat or bridge safety devices, connectors etc.
- Use only Assembléon recommended spares and tools.
- Keep fingers and other body parts outside the machine.

A2.4 Safety compliance

The safety of this machine is based on industry-specific criteria (international codes, regulations, and standards).

Since this machine is designed for operation in a flow line, full mechanical safety in accordance with these criteria is only guaranteed when openings of the run-in and run-out sections are covered by the preceding and succeeding equipment in the flow line.

This machine should not be operated as a stand-alone machine.

A2.5 Danger, warning and caution

■ Danger

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

A danger statement is displayed in this manner:



HAZARD IDENTIFICATION

Hazard consequence.
Hazard avoidance.

■ Warning

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

A warning statement is displayed in this manner:



HAZARD IDENTIFICATION

Hazard consequence.
Hazard avoidance.

■ Caution

Caution indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

A caution statement is displayed in this manner:



HAZARD IDENTIFICATION

Hazard consequence.
Hazard avoidance.

A2.6 Safety stickers




Pictogram	Category	Meaning
	1 Warning	DANGER OF CLAMPING FINGERS Serious injury to fingers. Keep hands away from moving parts.
	2 Warning	DANGER OF STRONG MAGNETIC FIELD Pacemaker and metal prosthetic users are at risk of serious injury or death. Stay away from the magnets.
	3 Warning	DANGER, HIGH VOLTAGE Contact may cause electric shock or burn. Turn off & lock out system before servicing.

Figure 1 Safety stickers

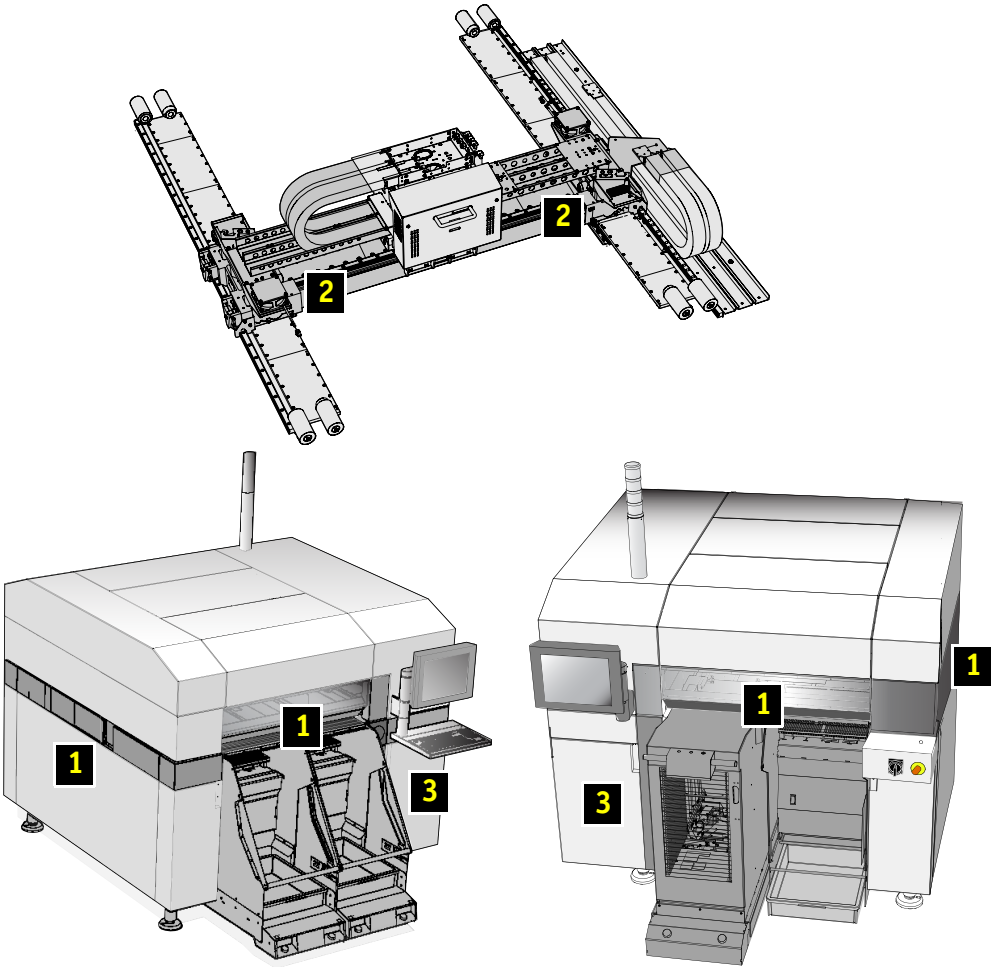


Figure 2 Location of safety stickers

A2.7 Safety devices

	Safety device	Hazard protected	Detection method	Machine condition after safety device is activated
1	Emergency stop button front and rear	Hazardous moving parts.	Safety circuit interruption by pushing the emergency stop button.	All moving parts will be stopped and power to servo systems is turned off.
2	Safety interlock.	Hazardous moving parts.	Safety circuit interruption by opening hood rear.	
3			Safety circuit interruption by opening hood front.	
4			Safety circuit interruption by lowering any trolley.	
5			Safety circuit interruption by removing any trolley lift cover.	
6	"Start on" button. PA 2410/00 only.	Uncontrolled power up	Preventing uncontrolled power up of machine after power failure.	Power to the machine is turned on.
7	Electrical disconnect.	Hazardous voltage.	Mains power supply to the machine interruption by turning the electrical main switch to 'off'.	All power to the machine is turned off.
8	Air disconnect.	Hazardous air pressure.	Main air supply to the machine interruption by turning the main air switch to 'off'.	All air pressure to the machine is turned off, and present air pressure is released safely.
9	Enabling switch front and rear	Hazardous moving parts	Device for running the machine with the front or rear hood opened, when troubleshooting, teaching or servicing. See A2.7.1.Enabling switch front/rear, usage	The XY robot runs at 12.5 % of its normal speed.

Figure 3 Safety devices

Locations of safety devices are depicted in [Figure 4](#) and [Figure 5](#).

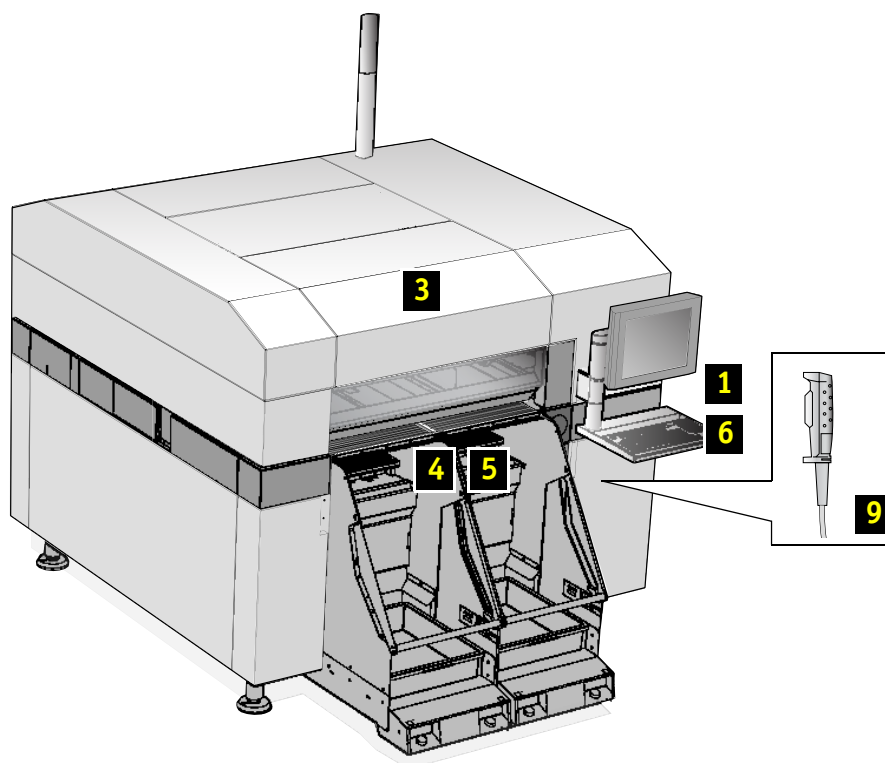


Figure 4 Location of safety devices, front

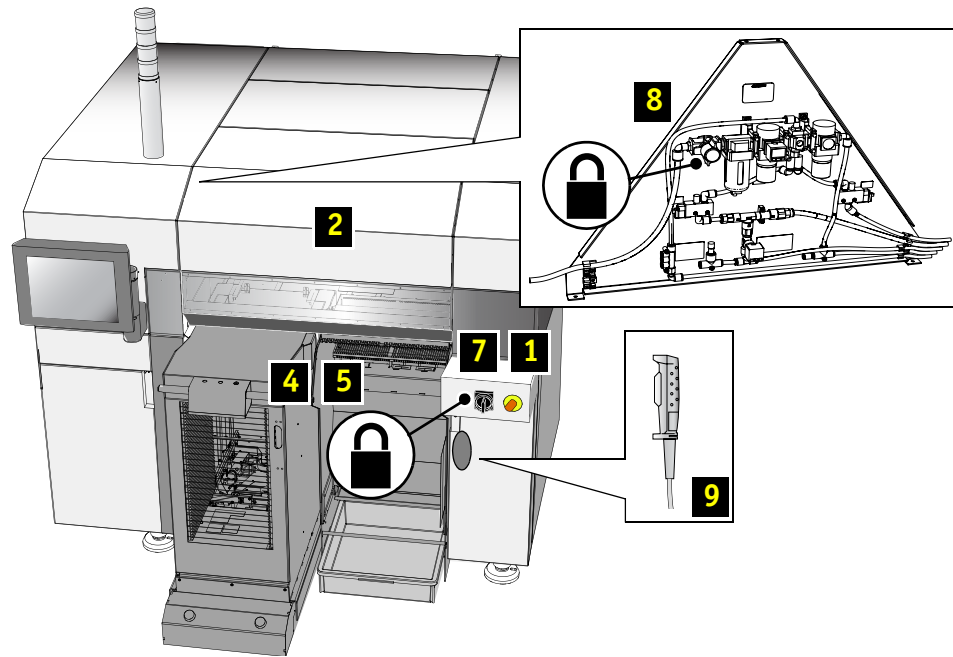


Figure 5 Location of safety devices, rear

Lock the electrical main switch (7) and the air main switch (8) by a padlock to avoid unauthorized use.

A2.7.1 Enabling switch front/rear, usage



DANGER OF MOVING PARTS

Serious injury to fingers and body parts.
Keep fingers and body parts outside the machine.

Use the enabling switch (1) only as a hold-to-run device to suspend the safety function of the hood (2). Keep fingers and other body parts outside the machine when using the enabling switch (1).

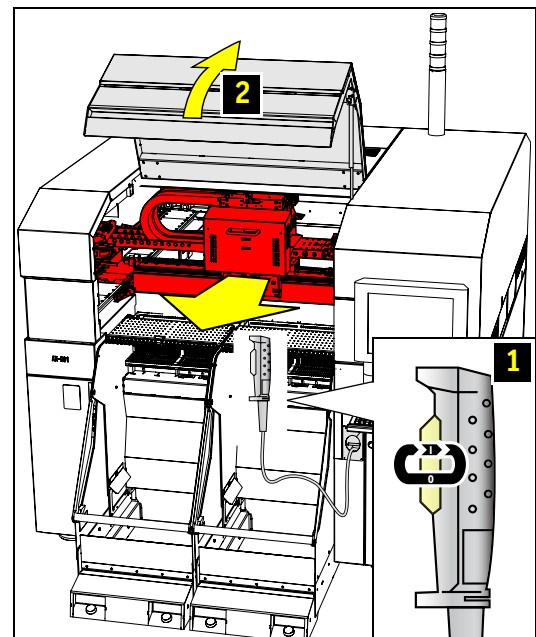
For teaching pick positions or for trouble shooting the machine can be operated with the hood (2) in opened position by using the enabling switch (1).

XY robot operation with open hood (2) is only possible when the enabling switch (1) is held in the middle position.

The XY robot (3) will run at 12.5 % of its normal speed.

Releasing the enabling switch (1) or squeezing the switch blocks further XY robot operation.

Each hood (front/rear) has its own enabling switch (front/rear).



A2.8 Noise levels

Location	Noise level
Sound pressure at operator's position	≤ 72 dB(A)
Average environmental noise level during measurement	≤ 58 dB(A)

Figure 6 Noise levels

A2.9 Emergency contact

In case assistance is needed during an emergency situation, contact the regional Assembléon organization.

Region	Number
Asia	+65-62-61-4611
America's	+1-800-474-4547
Europe	+31-20-5040679

Figure 7 Numbers

A2.10 Liability

Assembléon will not be liable for any costs, damages or personal injuries if the machine is not used according to the safety rules given in this manual.
Instructions written in English are original instructions.
Instructions written in other languages are a translation of the original.

A2.11 Recommended tools for working safely




Description	Picture	Application
1 Stepstool		Useful for smaller persons: reaching inside the machine or closing hoods.
2 Pallet truck		Lifting and moving of heavy modules.
3 Gloves		Skin protection during lubrication.

Figure 8 Recommended tools for working safely

A2.12 Material safety data sheets (MSDS)

For reason of environmental awareness, there is a growing demand for information on the ingredients of the maintenance materials (cleaning agents, lubricants etc.).

The relevant material safety data sheets (MSDS) are enclosed in this section.

Overview of used cleaning materials, lubricants etc.:

Code number	Supplier	Trade name	General description	MSDS no.
1311 504 84102	LOCTITE	LOCTITE 243, 50ml	SEALING AND LOCKING AGENT	08273
5322 390 10151	PHILIPS	ISOFLEX TOPAS NCA 52	BALL AND PLAIN BEARING GREASE	08189
9498 396 00143	PHILIPS	CMD ANTI-SCORING EP LUBE 3	LITHIUM GREASE	01583
5322 390 20159	PHILIPS	NSK GREASE NO. 1 (LR3)	GREASE	10138
1322 530 68801	PHILIPS	ETHANOL	ETHANOL, DENATURATED	00397
1322 526 41801	PHILIPS	MOLYKOTE	METAL PROTECTOR	12803
1303 500 42001	PHILIPS	MOLYKOTE DX	GREASE	14960
1322 534 33801	RHENUS	RHENUS NORLITH STM 2	BALL BEARING GREASE	24515
9498 396 02001	IKO	GREASE MG10-MT2	GREASE	10137

Figure 9 Maintenance materials

On the following pages the concerned MSDS sheets.

MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 01583
Code number : 5322 390 20157
Supplier : PHILIPS CONSUMER SERVICE
Tradenam e : CMD ANTI-SCORING EP LUBE 3
General description : LITHUIM GREASE
Emergency phonenumber +31 40 2755555

2. Composition/information on ingredients

Component	CAS-number	Percentage	EC-label
1 PETROLEUM HYDROCARBON	64741-95-3	59.0%	
2 PETROLEUM WAX	63231-60-7	14.0%	
3 RESIN ESTER	65997-13-9	5.0%	
4 POLYOXY ETHYLENE DINONYL PHENYL ETHER PHOSPHATE	39464-64-7	22.0%	

3. Hazards identification

- Product contains components that are on the black list surface water.
-

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, foam, extinguishing powder, water spray.
Hazardous decomposition products in fire : phosphorus oxide, phosphine, carbon monoxide, nitrous oxides.

6. Accidental release measures

A2-00002.fm

Procedure by spillage : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.

7. Handling and storage

Local exhausting : Under normal circumstances not applicable.

Storage conditions : Keep packing closed.

Do not store product close to ignition or heat sources.

8. Exposure controls/personal protection

Exposure limits (20 Cel. and 1013 mbar) :

TLV : 5 mg/m³ PETROLEUM HYDROCARBON (as oil aerosol)

Remarks exposure limits :
none

Odeur threshold (20 Cel. and 1013 mbar) :
not tracable

Advised personal protection

skin : butyl rubber gloves.

eyes : safety goggles.

inhalation : none (when used normally).

9. Physical and chemical properties

Physical state	: paste
Colour	: type dependent
Odour	: specific
Boiling point/range (Cel.)	: 119
Melting point/range (Cel.)	: 54
Flash point/range (Cel.)	: 229
Explosive limits	: LEL: 0.9 vol.% UEL: 7.0 vol.%
Dust explosions possible in air	: not applicable
Density at 20 Cel.	: 951 kg/m ³
Vapour pressure in kPa	: 0,04 (93 Cel)
Solubility in water	: none
pH	: not applicable
Viscosity	: > 150 mPa.s
Autoignition temperature (Cel.)	: > 300
Electrostatic chargement	: no
Log Po/w :	: 3,9-6 PETROLEUM HYDROCARBON > 6 PETROLEUM WAX

10. Stability and reactivity

Conditions to avoid	: none
Reaction with water	: no
Hazardous reactions with	: strong oxidizers.
Hazardous decomposition products at heating	: phosphor compounds.

A2-00002.fm

11. Toxicological information

Symptoms

Skin local : With intensive skin contact risk of skin affection.
 general : No absorption worth mentioning under normal working conditions.

Ingestion local : The substance is prickling: abdominal pain, nausea.
 No symptoms under normal working conditions.
 general : No absorption worth mentioning under normal working conditions.

Inhalation local : The substance is with atomising prickling: coughing.
 general : No absorption worth mentioning under normal working conditions.

Eyes local : The substance is prickling: redness, pain.

Remarks symptoms : None

Toxicity : LD-50 unknown

12. Ecotoxicological information

Biochemical oxygen demand : not traceable
 Chemical oxygen demand : not traceable
 Ecotoxicity : LC-50: > 1000 mg/l/96h (Fish) PETROLEUM
 HYDROCARBON
 EC-50: > 1000 mg/l/48h (Daphnia) PETROLEUM
 HYDROCARBON

Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation. Consider also return delivery to supplier.

14. Transport information

Class/figure RID/ADR : none
 Class IMO : none
 Class ICAO : none
 UN-number : none

15. Regulatory information

not applicable

Remarks on EC-labeling : The supplier does not give an EC-label (Userlabel).

16. Other information

Remarks on MSDS : none
 Inner company references : none
 Date last update : 1998-12-02
 Date last update but one : 1997-04-07

The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 08189
Code number : 5322 390 10151
Supplier : PHILIPS CONSUMER SERVICE
Tradename : ISOFLEX TOPAS NCA 52
General description : BALL AND PLAIN BEARING GREASE
Emergency phonenumber +31 40 2755555

2. Composition/information on ingredients

Component	CAS-number	Percentage	EC-label
1 SYNTHETIC HYDROCARBONS OIL			
2 CALCIUM SOAP			

3. Hazards identification

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray.
Hazardous decomposition products in fire : carbon monoxide, calcium oxide.

6. Accidental release measures

Procedure by spillage : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.

7. Handling and storage

A2-00002.fm

Local exhausting : Under normal circumstances not applicable.

Storage conditions : Store product at room temperature.

8. Exposure controls/personal protection

Exposure limits (20 Cel. and 1013 mbar) :
not determined

Remarks exposure limits :
none

Odeur threshold (20 Cel. and 1013 mbar) :
not tracable

Advised personal protection
skin : polyvinyl alcohol gloves.
eyes : safety goggles.
inhalation : none (when used normally).

9. Physical and chemical properties

Physical state	: paste
Colour	: beige
Odour	: specific
Boiling point/range (Cel.)	: not tracable
Melting point/range (Cel.)	: ≥ 180
Flash point/range (Cel.)	: ≥ 200
Explosive limits	: not tracable
Dust explosions possible in air	: not applicable
Density at 20 Cel.	: 850 - 890 kg/m ³
Vapour pressure in kPa	: not tracable
Solubility in water	: none
pH	: not applicable
Viscosity	: not tracable
Autoignition temperature (Cel.)	: not tracable
Electrostatic chargement	: no
Log Po/w :	: not tracable

10. Stability and reactivity

Conditions to avoid	: none
Reaction with water	: no
Hazardous reactions with	: strong oxidizers.
Hazardous decomposition products at heating	: none.

11. Toxicological information

Symptoms

Skin	local	: With intensive skin contact risk of skin affection.
	general	: Not applicable.
Ingestion	local	: The substance is prickling: abdominal pain.
	general	: Not applicable.
Inhalation	local	: Not applicable.

general : Not applicable.
Eyes local : The substance is prickling: redness.
Remarks symptoms : None
Toxicity : LD-50 unknown

12. Ecotoxicological information

Biochemical oxygen demand : not tracable
Chemical oxygen demand : not tracable
Ecotoxicity : none
Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation. Consider also return delivery to supplier.

14. Transport information

Class/figure RID/ADR : none
Class IMO : none
Class ICAO : none
UN-number : none

15. Regulatory information

not applicable
Remarks on EC-labeling : none

16. Other information

Remarks on MSDS : none
Inner company references : none
Date last update : 1999-07-07
Date last update but one : 1994-08-03

The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 08273
Code number : 1311 504 84102
Supplier : LOCTITE
Tradename : LOCTITE 243, 50 ML
General description : SEALING AND LOCKING AGENT
Emergency phonenumber +31 40 2755555

2. Composition/information on ingredients

Component	CAS-number	Percentage	EC-label
1 POLYETHYLENE GLYCOL DIMETHACRYLATE		30.0- 60.0%	
2 ORGANIC PEROXIDE (CORROSIVE)		1.0-5.0%	O,C; R: 7- 20/22-34
3 PLASTICIZER		10.0- 30.0%	

3. Hazards identification**4. First-aid measures**

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Bring the victim into the fresh air as soon as possible, let rest and if necessary call for a doctor.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.

Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray.
Hazardous decomposition products in fire : carbon monoxide.

6. Accidental release measures

A2-00002.fm

Procedure by spillage : Absorb the liquid in appropriate absorbent (e.g. Powersorb, dry sand, diatomite, vermiculite etc.), shovel the mixture into plastic bags and remove to the central depot for hazardous waste.

7. Handling and storage

Local exhausting : Under normal circumstances not applicable.

Storage conditions : Store product at a temperature between 8 and 21 degrees Celsius.

8. Exposure controls/personal protection

Exposure limits (20 Cel. and 1013 mbar) :
not determined

Remarks exposure limits :
none

Odeur threshold (20 Cel. and 1013 mbar) :
not tracable

Advised personal protection
skin : butyl rubber gloves.
eyes : safety goggles.
inhalation : none (when used normally).

9. Physical and chemical properties

Physical state	: liquid
Colour	: blue
Odour	: specific
Boiling point/range (Cel.)	: not tracable
Melting point/range (Cel.)	: not tracable
Flash point/range (Cel.)	: >=100
Explosive limits	: not tracable
Dust explosions possible in air	: not applicable
Density at 20 Cel.	: 1080 kg/m3
Vapour pressure in kPa	: <0,01 (25 Cel.)
Solubility in water	: none
pH	: not applicable
Viscosity	: not tracable
Autoignition temperature (Cel.)	: not tracable
Electrostatic chargement	: not tracable
Log Po/w :	: not tracable

10. Stability and reactivity

Conditions to avoid	: none
Reaction with water	: no
Hazardous reactions with	: peroxides.
Hazardous decomposition products at heating	: none.

11. Toxicological information

Symptoms

Skin local : May cause allergic reaction: chance of allergic dermatitis.
With intensive skin contact risk of skin affection.

general : Probably no absorption worth mentioning.

Ingestion local : Produces probably no symptoms.

general : Produces probably no symptoms.

Inhalation local : Produces probably no symptoms.

general : Produces probably no symptoms.

Eyes local : The substance is prickling: redness.

Remarks symptoms : None

Toxicity : LD-50: > 5 g/kg (ORL-RAT), TOTAL PRODUCT

12. Ecotoxicological information

Biochemical oxygen demand : not traceable

Chemical oxygen demand : not traceable

Ecotoxicity : none

Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation. Consider also return delivery to supplier.

14. Transport information

Class/figure RID/ADR : none

Class IMO : none

Class ICAO : none

UN-number : none

15. Regulatory information

not applicable

Remarks on EC-labeling : none

16. Other information

Remarks on MSDS : none

Inner company references : BXV 11-49

Date last update : 1999-12-01

Date last update but one : 1997-08-01

The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 10138
Code number : 5322 390 20159
Supplier : PHILIPS CONSUMER SERVICE
Tradename : NSK GREASE NO.1
General description : GREASE

Emergency phonenumber +31 40 2755555

2. Composition/information on ingredients

	Component	CAS-number	Percentage	EC-label
1	SYNTHETIC OIL		73.0-78.0%	
2	LITHIUM SOAP		21.0-23.0%	
3	ANTI OXIDANT		1.0-3.0%	
4	INHIBITORS		0.5-1.5%	

3. Hazards identification

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray.
Hazardous decomposition products in fire : carbon monoxide, nitrous oxides.

6. Accidental release measures

Procedure by spillage : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.

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7. Handling and storage

Local exhausting : Under normal circumstances not applicable.

Storage conditions : Do not store product close to ignition sources.

8. Exposure controls/personal protection

Exposure limits (20 Cel. and 1013 mbar) :

TLV : 5 mg/m³ SYNTHETIC OIL (as oil aerosol)

Remarks exposure limits :

none

Odeur threshold (20 Cel. and 1013 mbar) :

not traceable

Advised personal protection

skin : butyl rubber gloves.

eyes : safety goggles.

inhalation : none (when used normally).

9. Physical and chemical properties

Physical state	: paste
Colour	: white
Odour	: almost odourless
Boiling point/range (Cel.)	: not applicable
Melting point/range (Cel.)	: see info. section 16 SDS.
Flash point/range (Cel.)	: 225
Explosive limits	: not applicable
Dust explosions possible in air	: not applicable
Density at 20 Cel.	: 920 kg/m ³
Vapour pressure in kPa	: < 0,1
Solubility in water	: none
pH	: not applicable
Viscosity	: > 150 mPa.s
Autoignition temperature (Cel.)	: > 300
Electrostatic charge	: no
Log Po/w :	: not traceable

10. Stability and reactivity

Conditions to avoid	: none
Reaction with water	: no
Hazardous reactions with	: oxidizing substances, strong acids.
Hazardous decomposition products at heating	: none.

11. Toxicological information

Symptoms

Skin local : With intensive skin contact risk of skin affection.
 general : Not applicable.

Ingestion local : No symptoms under normal working conditions.
 general : No absorption worth mentioning under normal working conditions.

Inhalation local : Not applicable.
 general : Not applicable.

Eyes local : The substance is prickling: redness.

Remarks symptoms : None

Toxicity : LD-50 unknown

12. Ecotoxicological information

Biochemical oxygen demand : not traceable
Chemical oxygen demand : not traceable
Ecotoxicity : none
Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation. Consider also return delivery to supplier.

14. Transport information

Class/figure RID/ADR : none
Class IMO : none
Class ICAO : none
UN-number : none

15. Regulatory information

not applicable

Remarks on EC-labeling : The supplier does not give an EC-label (Userlabel).

16. Other information

Remarks on MSDS : At temperatures above 190 degrees Celsius the product becomes soft.
Inner company references : none
Date last update : 1998-12-02
Date last update but one : 1997-03-25

The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.



PHILIPS

MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 00397
Product code 12nc : 1322 530 68801
Supplier : CHEMPROHA CHEMIEPARTNER B.V.
 POSTBUS 872
 3300 AW ZWIJNDRECHT
 Netherlands
 Tel: 078-6544944
 Fax: 078-6191399
Tradename : ETHANOL 99,8%, DENATURATED WITH 5% METHANOL 1-24009
General description : ETHANOL, DENATURATED
Use : Miscellaneous
Publicationdate : 2003-03-05
Emergency phonenumber +31 (0)497-598315

2. Composition/information on ingredients

Component	CAS-number	EC-number	Percentage	EC-label
ETHANOL	64-17-5	200-578-6	≥90.0 -≤97.0 %	F;R: 11
METHANOL	67-56-1	200-659-6	≥3.0 -≤10.0 %	F,T;R: 11-23/24/25-39/23/24/25

3. Hazard identification



R-phrases

- Highly flammable.
- Harmful by inhalation, in contact with skin and if swallowed.
- Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.

4. First-aid measures

Skin : Remove contaminated clothes as soon as possible. Remove residue substance as soon as possible (f.i. rinse with much water). In case of a serious exposure call for a doctor.
Ingestion : If victim is conscious let him drink 1 or 2 glasses of water. In case of general disorders bring victim into the hospital, otherwise call for a doctor.
Inhalation : Bring victim into the fresh air as soon as possible and let rest. In case of severe exposure call for a doctor. In case of breathing problems, loose squeezing clothes and if victim is conscious bring victim in high sitting position. In case of stagnation of breathing give IMMEDIATELY oxygen and transport to hospital as soon as possible.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, water spray, alcohol resistant foam
Hazardous decomposition products in fire : carbon monoxide

6. Accidental release measures

Spillage procedure : Absorb the liquid in appropriate absorbent (e.g. Powersorb, dry sand, diatomite, vermiculite etc.), shovel the mixture into plastic bags and remove to the central depot for hazardous waste.
Emergency procedure : not applicable

7. Handling and storage

Local exhausting : Depends on processing circumstances, but at least good room ventilation.
Storage conditions : Keep container in a well-ventilated place.
 Keep away from sources of ignition - No smoking.
 Keep packing closed.
 Store product in a cool, dry and well ventilated area.

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8. Exposure controls/personal protection

Exposure limits :		
TLV:	1000 mg/m3	ETHANOL
	applicable to: Netherlands (20 °C; 1013 mbar)	
TLV:	1907 mg/m3	ETHANOL
	applicable to: Belgium (20 °C; 1013 mbar)	
TLV:	1900 mg/m3	ETHANOL
	applicable to: Germany (20 °C; 1013 mbar)	
TLV:	1880 mg/m3	ETHANOL
	applicable to: United States (25 °C; 1013 mbar)	
TLV:	266 mg/m3	S METHANOL
STEL:	333 mg/m3	S METHANOL
	applicable to: Belgium (20 °C; 1013 mbar)	
TLV:	260 mg/m3	S METHANOL
STEL:	330 mg/m3	S METHANOL
	applicable to: United States (25 °C; 1013 mbar)	
TLV:	270 mg/m3	S METHANOL
	applicable to: Germany (20 °C; 1013 mbar)	
* TLV:	260 mg/m3	S METHANOL
STEL:	520 mg/m3	S METHANOL
	applicable to: Netherlands (20 °C; 1013 mbar)	

C=Ceiling; S=Skin

Remarks exposure limits :
none

Odour threshold (20°C; 1013 mbar) :
≥96 -≤220.8 mg/m3 ETHANOL
≥5.586 -≤7980 mg/m3 METHANOL

Advised personal protection :
skin : butyl rubber gloves
neoprene gloves
eyes : safety goggles
inhalation : none (when sufficient exhausting)

9. Physical and chemical properties

Physical state	: liquid
Colour	: colourless
Odour	: alcoholic
Vapor rate/range	: not traceable
Boiling point/range	: ≥65 °C -≤78 °C (1013 mbar)
Melting point/range	: ≥-117 °C -≤-98 °C
Flash point/range	: ≥11 °C -≤12 °C
Explosive limits	: LEL:≥3.4 vol.% -UEL:≤36.5 vol.%
Dust explosions possible in air	: not applicable
Relative density	: ≥0.79000 -≤0.81 (water=1) (20 °C)
Vapour pressure	: 12.7 kPa (20 °C)
Solubility in water	: complete
Solubility in fat	: not traceable
pH	: ≥5 -≤9
Viscosity	: 1.22 mPa.s (20 °C)
Autoignition temperature	: ≥370 °C -≤455 °C
Decomposition temperature	: not traceable
Electrostatic chargement	: not traceable

10. Stability and reactivity

Conditions to avoid	: none
Reactions with water	: no
Hazardous reactions with	: oxidizing substances, alkaline earth metals, alkali metals, alkali oxides
Hazardous decomposition products at heating	: none

11. Toxicological information

Symptoms		
Skin	local	: The substance is prickling: redness.
		: Degreasing: in case of sustained contact a rough, dry skin, eczema.
	general	: Probably no absorption worth mentioning.
Ingestion	local	: The substance is prickling: sore throat.
		: No symptoms under normal working conditions.
	general	: The substance may be absorbed after ingestion.
Inhalation		: The substance is intoxicating: headache, drowsiness, dizziness. Large quantities may cause: unconsciousness, agitation.
	local	: The vapour is prickling: sore throat, coughing.
	general	: The vapour may be absorbed by inhalation.
Eyes		: For phenomena, see ingestion general.
	local	: The substance is prickling: redness, pain.
		: After prolonged exposure possibly effects on: the nervous system.
Remarks symptoms		

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Toxicity :

LD-50: 7.06 g/kg (ORL-RAT), ETHANOL
 LD-50: >20 g/kg (SKN-RBT), ETHANOL
 LC-50: 124.7 mg/l/4H (IHL-RAT), ETHANOL
 LD-50: 5.628 g/kg (ORL-RAT), METHANOL
 LC-50: 83.8 mg/l/4H (IHL-RAT), METHANOL
 LD-50: 15.8 g/kg (SKN-RBT), METHANOL

Source : IUCLID
Source : ChemDat (Merck)
Source : IUCLID
Source : IUCLID
Source : IUCLID
Source : IUCLID

Ames test : not traceable

12. Ecotoxicological information

Biological oxygen demand (5) : 0.97 g/g ETHANOL
 0.6 g/g METHANOL
Chemical oxygen demand : 1.70 g/g ETHANOL
 1.42 g/g METHANOL
Biological(5)/chemical oxygen demand ratio : 0.57 ETHANOL
 0.42 METHANOL
Degradability : easy degradable ETHANOL
 easy degradable METHANOL
Biochemical factor : 0.66 ETHANOL
 <10 METHANOL
Log Po/w : -0.32 ETHANOL
 -0.77 METHANOL
Henry Constant : not traceable

Source : IUCLID
Source : IUCLID
Source : IUCLID
Source : IUCLID
Source : ChemDat (Merck)
Source : ChemDat (Merck)
Source : ChemDat (Merck)
Source : IUCLID
Source : IUCLID
Source : IUCLID

Ecotoxicity :

LC-50: 11000 mg/l/96H (Fish), ETHANOL
 EC-50: ≥9268 -≤14221 mg/l/48H (Daphnia), ETHANOL
 LC-50: 15400 mg/l/96H (Fish), METHANOL
 EC-50: >10000 mg/l/48H (Daphnia), METHANOL

Source : IUCLID
Source : IUCLID
Source : IUCLID
Source : ChemDat (Merck)

Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation. Consider also return delivery to supplier. Uncleaned empty packagings may contain inflammable and/or explosive mixtures.

14. Transport information

ADR/RID **UN-number** : 1170 ETHANOL SOLUTION
Class : 3
Packinggroup : III
Transport emergency card : 30S1170
IMO **UN-number** : 1170 ETHANOL SOLUTION
Class : 3
Packinggroup : III
Marine pollutant : no
IATA/ICAO **UN-number** : 1170 ETHANOL SOLUTION
Class : 3
Packinggroup : III

15. Regulatory information

Hazard symbol
 F (HIGHLY FLAMMABLE)
 Xn (HARMFUL)
R-phrases
 11 Highly flammable.
 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.
 68/20/21/22 Harmful: possible risk of irreversible effects through inhalation, in contact with skin and if swallowed.
S-phrases
 9 Keep container in a well-ventilated place.
 16 Keep away from sources of ignition - No smoking.
 36/37 Wear suitable protective clothing and gloves.
Hazardous component(s) : METHANOL
Remarks on EC-labeling : The supplier may give a different EC-label (Userlabel).

16. Other information

Remarks on MSDS : none
Inner company references : none

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Overview relevant R-sentences from all components in section 2 :

11	Highly flammable.
23/24/25	Toxic by inhalation, in contact with skin and if swallowed.
39/23/24/25	Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Date last update : 2004-01-19

* Point to alterations with regard to the previous version.

The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

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MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 12803
Product code 12nc : 1322 526 41801
Supplier : DOW CORNING
 62, RUE GENERAL DE GAULLE
 1310 TERHULPEN
 Belgium
 Tel: +32-2-655-2523
 Fax: +32-2-655-2002
Tradename : MOLYKOTE METAL PROTECTOR PLUS
General description : WAX SOLUTION
Use : Miscellaneous
Publicationdate : 2003-03-05
Emergency phonenumber +31 (0)497-598315

2. Composition/information on ingredients

Component	CAS-number	EC-number	Percentage	EC-label
STODDARD SOLVENT (C6H6 <0.1%)	8052-41-3	232-489-3		Xn;R: 10-65
WAX				

3. Hazard identification

R-phrases
 • Flammable.

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Bring the victim into the fresh air as soon as possible, let rest and if necessary call for a doctor.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray
Hazardous decomposition products in fire : carbon monoxide

6. Accidental release measures

Spillage procedure : Absorb the liquid in appropriate absorbent (e.g. Powersorb, dry sand, diatomite, vermiculite etc.), shovel the mixture into plastic bags and remove to the central depot for hazardous waste.
Emergency procedure : not applicable

7. Handling and storage

Local exhausting : Depends on processing circumstances, but at least good room ventilation.
Storage conditions : Store product in a well ventilated area.
 Do not store product close to ignition sources.

8. Exposure controls/personal protection

Exposure limits :
 TLV: 575 mg/m3 STODDARD SOLVENT (C6H6 <0.1%)
 applicable to: Netherlands (20 °C; 1013 mbar)
 TLV: 533 mg/m3 STODDARD SOLVENT (C6H6 <0.1%)
 applicable to: Belgium (20 °C; 1013 mbar)
 TLV: 570 mg/m3 STODDARD SOLVENT (C6H6 <0.1%)
 applicable to: United States (25 °C; 1013 mbar)
 not determined WAX
 C=Ceiling; S=Skin

Remarks exposure limits :
 none

Odour threshold (20°C; 1013 mbar) :
 not traceable

Advised personal protection :
 skin : butyl rubber gloves
 eyes : safety goggles
 inhalation : none (when sufficient exhausting)

9. Physical and chemical properties

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Physical state	: liquid
Colour	: yellow
Odour	: like solvents
Vapor rate/range	: not traceable
Boiling point/range	: The product decomposes before it boils.
Melting point/range	: not traceable
Flash point/range	: 28 °C
Explosive limits	: not traceable
Dust explosions possible in air	: not applicable
Relative density	: 0,81000 (water=1) (20 °C)
Vapour pressure	: not traceable
Solubility in water	: none
Solubility in fat	: not traceable
pH	: not applicable
Viscosity	: not traceable
Autoignition temperature	: not traceable
Decomposition temperature	: >150 °C
Electrostatic chargement	: not traceable

10. Stability and reactivity

Conditions to avoid	: none
Reactions with water	: no
Hazardous reactions with	: strong oxidizers
Hazardous decomposition products at heating	: formaldehyde

11. Toxicological information

Symptoms		
Skin	local	: The substance is prickling: redness.
		: Degreasing: in case of sustained contact a rough, dry skin, eczema.
Ingestion	general	: No absorption worth mentioning under normal working conditions.
	local	: The substance is prickling: abdominal pain, vomiting, diarrhoea, coughing.
Inhalation		: Chance of pulmonary affections if choked.
		: No symptoms under normal working conditions.
	general	: For phenomena, see inhalation general.
		: No absorption worth mentioning under normal working conditions.
Eyes	local	: The vapour is prickling: sore throat, coughing, shortness of breath.
		: The vapour may be absorbed by inhalation.
Remarks symptoms		: The vapour is intoxicating: drowsiness. Large concentrations may cause: restricted awareness.
Toxicity		: LD-50: >5 g/kg (ORL-RAT), STODDARD SOLVENT (C6H6 <0.1%)

12. Ecotoxicological information

Biological oxygen demand (5)	: not traceable
Chemical oxygen demand	: not traceable
Biological/chemical oxygen demand ratio	: not traceable
Biochemical factor	: not traceable
Log Po/w	: not traceable
Ecotoxicity	: not traceable
Remarks on ecotoxicity	: none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation. Consider also return delivery to supplier. Uncleaned empty packagings may contain inflammable and/or explosive mixtures.

14. Transport information

* ADR/RID	UN-number	: 1993 FLAMMABLE LIQUID, N.O.S. (STODDARD SOLVENT (C6H6 <0.1%))
	Class	: 3
	Packinggroup	: III
	Transport emergency card	: 30GF1-III
* IMO	UN-number	: 1993 FLAMMABLE LIQUID, N.O.S. (STODDARD SOLVENT (C6H6 <0.1%))
	Class	: 3
	Packinggroup	: III
	Marine pollutant	: no
* IATA/CAO	UN-number	: 1993 FLAMMABLE LIQUID, N.O.S. (STODDARD SOLVENT (C6H6 <0.1%))
	Class	: 3
	Packinggroup	: III

15. Regulatory information

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Hazard symbol	none
R-phrases	10 Flammable.
S-phrases	23.2 Do not breath vapour. 24 Avoid contact with skin. 43.13 In case of fire, use carbon dioxide, powder extinguisher, foam or water spray. 62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.
Hazardous component(s)	: not applicable
Remarks on EC-labeling	: The supplier may give a different EC-label (Userlabel).

16. Other information

Remarks on MSDS	: none
Inner company references	: none
Overview relevant R-sentences from all components in section 2 :	
10	Flammable.
65	Harmful: may cause lung damage if swallowed.
Date last update	: 2003-03-05

* Point to alterations with regard to the previous version.
The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of at the date of its printing.

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PHILIPS

MATERIAL SAFETY DATA SHEET

According EC 91/155

1. Identification of the substance/preparation

MSDS : 14960
Product code 12nc : 1303 500 42001
Supplier : DOW CORNING
 62, RUE GENERAL DE GAULLE
 1310 TERHULPEN
 Belgium
 Tel: +32-2-655-2523
 Fax: +32-2-655-2002
Tradename : MOLYKOTE DX
General description : LUBRICATING PASTE
Use : Various
Publicationdate : 2001-01-05
General information : dangerous.goods@philips.com
Emergency phonenumber : +31 (0)497-598315

2. Hazard identification

* R-phrases

- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

3. Composition/information on ingredients

Component	CAS-no	EC-no	Catalogue-no	Percentage(%)	EC-label
* DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	64742-52-5	265-155-0	649-465-00-7	23.0	Xn;R: 65
* DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	64741-96-4	265-097-6	649-457-00-3	17.0	Xn;R: 65
* DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	64742-54-7	265-157-1	649-467-00-8	6.0	Xn;R: 65
* DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	64742-65-0	265-169-7	649-474-00-6	6.0	Xn;R: 65
* DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	64741-88-4	265-090-8	649-454-00-7	6.0	Xn;R: 65
ZINC OXIDE	1314-13-2	215-222-5	030-013-00-7	2.0	N;R: 50/53
* N-ALKYL (C16-C18) TRIMETHYLENEDIAMINE	68153-99-1	268-902-9		3.0	C;R: 22 34

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray
Unsuitable fire-extinguisher : not traceable
Special fire-fighting equipment : In the event of fire, wear protective clothing and use breathing apparatus that is independent of the ambient air.
*** Hazardous decomposition products in fire** : carbon monoxide, nitrous oxides, zinc oxide

6. Accidental release measures

Spillage procedure : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.
Emergency procedure : not applicable

7. Handling and storage

Local exhausting : Under normal circumstances not applicable.
Storage conditions : Store product in a well ventilated area, dry.
Storage code (on behalf of PGS 15) : none

8. Exposure controls/personal protection

Date of request : 2007-09-27

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Exposure limits :

applicable to: The Netherlands (20 °C; 1013 mbar)		
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)(as oil aerosol) (Statutory threshold limit value)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)(as oil aerosol) (Statutory threshold limit value)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol) (Statutory threshold limit value)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol) (Statutory threshold limit value)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol) (Statutory threshold limit value)
TWA(8 hours):	5 mg/m3	ZINC OXIDE(as fume)
No TWA has been laid down.		N-ALKYL (C16-C18) TRIMETHYLENEDIAMINE
applicable to: Belgium (20 °C; 1013 mbar)		
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)(as oil aerosol)
TWA(15 minutes):	10 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)(as oil aerosol)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)(as oil aerosol)
TWA(15 minutes):	10 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)(as oil aerosol)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol)
TWA(15 minutes):	10 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol)
TWA(15 minutes):	10 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol)
TWA(8 hours):	5 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol)
TWA(15 minutes):	10 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)(as oil aerosol)
TWA(8 hours):	5 mg/m3	ZINC OXIDE(as fume)
TWA(15 minutes):	10 mg/m3	ZINC OXIDE(as fume)
TWA(8 hours):	10 mg/m3	ZINC OXIDE(as dust)
applicable to: Germany (20 °C; 1013 mbar)		
TWA(8 hours):	500 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)(carbonhydrogen mix, group 2)
TWA(8 hours):	1000 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)(carbonhydrogen mix, group 1)
TWA(8 hours):	1000 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)(carbonhydrogen mix, group 1)
TWA(8 hours):	1000 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)(carbonhydrogen mix, group 1)
TWA(8 hours):	1000 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)(carbonhydrogen mix, group 1)
applicable to: United States of America (25 °C; 1013 mbar)		
TWA(8 hours):	0.2 mg/m3	DISTILLATES (PETROLEUM),

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TWA(8 hours):	0.2 mg/m3	HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)(as mineral oil, inhalable dust)
TWA(8 hours):	0.2 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)(as mineral oil, inhalable dust)
TWA(8 hours):	0.2 mg/m3	DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)(as mineral oil, inhalable dust)
TWA(8 hours):	0.2 mg/m3	DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)(as mineral oil, inhalable dust)
TWA(8 hours):	2 mg/m3	ZINC OXIDE(as respirable fume)
TWA(15 minutes):	10 mg/m3	ZINC OXIDE(as respirable fume)

C=Ceiling; S=Skin

Remarks exposure limits :
none

Odour threshold (20°C; 1013 mbar) :
not traceable

DNEL (Derived No Effect Level)

not traceable

PNEC (Predicted No Effect Concentration)

not traceable

Advised personal protection :

Hands	:	polyvinyl alcohol gloves
Eyes	:	safety goggles
Inhalation	:	none (when sufficient exhausting)
Skin	:	none (when used normally)

9. Physical and chemical properties

Physical state	:	paste
Colour	:	white
Odour	:	almost odourless
Vapor rate/range	:	not traceable
Boiling point/range	:	not traceable
Melting point/range	:	not traceable
Flash point/range	:	≥100 °C
Explosive limits	:	not traceable
Dust explosions possible in air	:	not applicable
Relative density	:	1.14000 (water=1) (20 °C)
Vapour pressure	:	not traceable
Solubility in water	:	none
Solubility in fat	:	not traceable
pH	:	not applicable
Viscosity	:	not traceable
Autoignition temperature	:	not traceable
Decomposition temperature	:	>150 °C
* Electrostatic charge	:	no

10. Stability and reactivity

Conditions to avoid	:	none
Reactions with water	:	no
Hazardous reactions with	:	oxidizing substances
Hazardous decomposition products at heating	:	formaldehyde

11. Toxicological information

Symptoms

Skin	local	:	With intensive skin contact risk of skin affection.
	general	:	No absorption worth mentioning under normal working conditions.
Ingestion	local	:	No symptoms under normal working conditions.
	general	:	The substance may be absorbed after ingestion.
Inhalation	local	:	No absorption worth mentioning under normal working conditions.
	general	:	The vapour and the fumes are prickling: coughing.
Eyes	local	:	No absorption worth mentioning under normal working conditions.
	general	:	The substance is prickling: redness.
Remarks symptoms		:	None

Toxicity :

LD-50: >2 g/kg (ORL-RAT), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	Source	:	CONCAWE
LD-50: >2 g/kg (SKN-RBT), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	Source	:	CONCAWE

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LD-50: >2 g/kg (ORL-RAT), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2 g/kg (SKN-RBT), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2 g/kg (ORL-RAT), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2 g/kg (SKN-RBT), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2 g/kg (ORL-RAT), DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2 g/kg (SKN-RBT), DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2.0 g/kg (ORL-RAT), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LD-50: >2.0 g/kg (SKN-RBT), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LD-50: >5 g/kg (ORL-RAT), ZINC OXIDE	Source	: ChemDat (Merck)

Ames test : not traceable

12. Ecotoxicological information

Biological oxygen demand (5)	: not traceable	
Chemical oxygen demand	: not traceable	
Biological/chemical oxygen demand ratio	: not traceable	
Degradability	: degradable DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Source : CONCAWE
	: degradable DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source : CONCAWE
	: degradable DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source : CONCAWE
Biochemical factor	: not traceable	
Log Po/w	: ≥3.9 - ≤6 DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	Source : CONCAWE
	: ≥3.9 - ≤6 DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Source : CONCAWE
	: ≥3.9 - ≤6 DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	Source : CONCAWE
	: ≥3.9 - ≤6 DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source : CONCAWE
	: ≥3.9 - ≤6 DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source : IUCLID
Henry Constant	: not traceable	
Ecotoxicity :		
LC-50: >1000 mg/l/96H (Fish), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	Source	: CONCAWE
EC-50: >1000 mg/l/48H (Daphnia), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	Source	: CONCAWE
IC-50: >1000 mg/l/72H (Algae), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY NAPHTHENIC (DMSO <3%)	Source	: CONCAWE
LC-50: >5000 mg/l/96H (Fish), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Method	: OECD 203
EC-50: >1000 mg/l/48H (Daphnia), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Source	: IUCLID
IC-50: >1000 mg/l/72H (Algae), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY NAPHTHENIC (DMSO <3%)	Source	: CONCAWE
LC-50: >5000 mg/l/96H (Fish), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	Method	: OECD 203
EC-50: >1000 mg/l/48H (Daphnia), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	Source	: IUCLID
IC-50: >1000 mg/l/72H (Algae), DISTILLATES (PETROLEUM), HYDROTREATED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LC-50: >1000 mg/l/96H (Fish), DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
EC-50: >1000 mg/l/48H (Daphnia), DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
IC-50: >1000 mg/l/72H (Algae), DISTILLATES (PETROLEUM), SOLVENT-DEWAXED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LC-50: >1000 mg/l/96H (Fish), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
EC-50: >1000 mg/l/48H (Daphnia), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
IC-50: >1000 mg/l/72H (Algae), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
LC-50: 2246 mg/l/96H (Fish), ZINC OXIDE	Source	: Easi View
Remarks on ecotoxicity	: none	

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13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation.

14. Transport information

Not subject to Transport-regulation Dangerous Substances

15. Regulatory information

Hazard symbol

none

* R-phrases

52/53

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

* S-phrases

61

Avoid release to the environment. Refer to special instructions/Safety data sheets.

Hazardous component(s)

: not applicable

Remarks on EC-labeling

: The supplier may give a different EC-label (Userlabel).

16. Other information

Remarks on MSDS

: The component(s), as mentioned in section 3, are registered in the Toxic Substances Control Act Inventory (USA).

Overview relevant R-sentences from all components in section 3 :

22

Harmful if swallowed.

34

Causes burns.

50/53

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

65

Harmful: may cause lung damage if swallowed.

Date last update

: 2004-12-23

* Point to alterations with regard to the previous version.

The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

WORKPLACE INSTRUCTION CARD (14960)

Date last update:2004-12-23

Date of request:2007-09-27

IDENTIFICATION

Product code 12nc : 1303 500 42001
Supplier : DOW CORNING
Tradename : MOLYKOTE DX
General description : LUBRICATING PASTE
Appearance : paste - white - almost odourless

USAGELABEL (The supplier may give a different EC-label (Userlabel).)

*** R-phrases** : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
*** S-phrases** : Avoid release to the environment. Refer to special instructions/Safety data sheets.
Hazardous components : not applicable

FIRST AID

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.

PRECAUTIONARY MEASURES

polyvinyl alcohol gloves



safety goggles

Skin : none (when used normally)
Local exhausting : Under normal circumstances not applicable.
Spillage procedure : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.
Emergency procedure : not applicable
Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray
Unsuitable fire-extinguisher : not traceable
Reaction with water : no

* Point to alterations with regard to the previous version.

The information provided in this Instructioncard is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.



PHILIPS

MATERIAL SAFETY DATA SHEET

According EC 1907/2006 (REACH)

1. Identification of the substance/preparation

MSDS : 24515
Product code 12nc : 1322 534 33801
Supplier : RHENUS LUB GMBH & CO KG
 Erkelenzer Str. 36
 D-41179 Mönchengladbach
 Germany
 TEL: + 49(0)2161-5869-0
 FAX: + 49(0)2161-5869-93

Tradename : RHENUS NORLITH STM 2
General description : BALL BEARING GREASE
Use : Various
Publicationdate : 2008-01-15
General information : dangerous.goods@philips.com
Emergency phonenumber : +31 (0)497-598315

2. Hazard identification

3. Composition/information on ingredients

Component	CAS-no	EC-no	Catalogue-no	Percentage(%)	EC-label
MINERAL OIL					
LITHIUM SOAP					
ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	4259-15-8	224-235-5		<2.5	N;R: 51/53

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray
Unsuitable fire-extinguisher : not traceable
Special fire-fighting equipment : In the event of fire, wear protective clothing and use breathing apparatus that is independent of the ambient air.
Hazardous decomposition products in fire : carbon monoxide, zinc oxide, sulphur oxides, phosphorus oxide, lithium oxide

6. Accidental release measures

Spillage procedure : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.
Emergency procedure : not applicable

7. Handling and storage

Local exhausting : Under normal circumstances not applicable.
Storage conditions : Store product protected from the sun, frost free.
Storage code (on behalf of PGS 15) : none

8. Exposure controls/personal protection

Exposure limits :
applicable to: The Netherlands (20 °C; 1013 mbar)
 TWA(8 hours): 5 mg/m3 MINERAL OIL(as oil aerosol) (Statutory threshold limit value)
 No TWA has been laid down. LITHIUM SOAP
 No TWA has been laid down. ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-
applicable to: Belgium (20 °C; 1013 mbar)
 TWA(8 hours): 5 mg/m3 MINERAL OIL(as oil aerosol)

Date of request : 2008-08-18

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TWA(15 minutes): 10 mg/m3 MINERAL OIL(as oil aerosol)

applicable to: Germany (20 °C; 1013 mbar)
TWA(8 hours): 200 mg/m3 MINERAL OIL(carbonhydrogen mix, group 4)

applicable to: United States of America (25 °C; 1013 mbar)
TWA(8 hours): 0.2 mg/m3 MINERAL OIL(as mineral oil, inhalable dust)

C=Ceiling; S=Skin

Remarks exposure limits :

none

Odour threshold (20°C; 1013 mbar) :

not traceable

DNEL (Derived No Effect Level)

not traceable

PNEC (Predicted No Effect Concentration)

not traceable

Advised personal protection :

Hands : polyvinyl alcohol gloves
Eyes : safety goggles
Inhalation : none (when sufficient exhausting)
Skin : none (when used normally)

9. Physical and chemical properties

Physical state : paste
Colour : brown
Odour : specific
Vapor rate/range : not traceable
Boiling point/range : not traceable
Melting point/range : >180 °C
Flash point/range : >200 °C
Explosive limits : not traceable
Dust explosions possible in air : not applicable
Relative density : ≥0.88 - ≤0.92 (water=1) (20 °C)
Vapour pressure : not traceable
Solubility in water : none
Solubility in fat : not traceable
pH : not applicable
Viscosity : not traceable
Autoignition temperature : not traceable
Decomposition temperature : not traceable
Electrostatic chagement : no

10. Stability and reactivity

Conditions to avoid : none
Reactions with water : no
Hazardous reactions with : oxidizing substances
Hazardous decomposition products at heating : none

11. Toxicological information

Symptoms

Skin : local : The substance is prickling: redness.
: general : Probably no absorption worth mentioning.
Ingestion : local : The substance is prickling: sore throat.
: general : Probably no absorption worth mentioning.
Inhalation : local : The substance is with atomising prickling: sore throat.
: general : Probably no absorption worth mentioning.
Eyes : local : The substance is prickling: redness.
Remarks symptoms : None

Toxicity :

LD-50: 3.1 g/kg (ORL-RAT), ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-

Method : OECD 401

Source : IUCLID

LD-50: >5.0 g/kg (SKN-RBT), ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-

Method : OECD 402

Source : IUCLID

Ames test : negative ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-

Source : Supplier

12. Ecotoxicological information

Biological oxygen demand (5) : not traceable
Chemical oxygen demand : not traceable
Biological/chemical oxygen demand ratio : not traceable

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Degradability	: degradable ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	Source	: Supplier
Biochemical factor	: not traceable		
Log Po/w	: 2.86 ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	Source	: IUCLID
Henry Constant	: 0.0111 atm m ³ /mol ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	Source	: Easi View

Ecotoxicity :			
LC-50: >1 - ≤5 mg/l/96H (Fish), ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	Method	: OECD 203	
	Source	: IUCLID	
EC-50: >1 - ≤1.5 mg/l/48H (Daphnia), ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	Method	: OECD 202	
	Source	: IUCLID	
IC-50: >1 - ≤5 mg/l/96H (Algae), ETHYLHEXYL ZINC DITHIOPHOSPHATE, 2-	Method	: OECD 201	
	Source	: IUCLID	

Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation.

14. Transport information

Not subject to Transport-regulation Dangerous Substances

15. Regulatory information

EC-Label	: not applicable
Remarks on EC-labeling	: none

16. Other information

Remarks on MSDS : none

Overview relevant R-sentences from all components in section 3 :
51/53 Toxic to the aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Date last update : 2008-01-15

* Point to alterations with regard to the previous version.
The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

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WORKPLACE INSTRUCTION CARD (24515)

Date last update:2008-01-15
Date of request:2008-08-18

IDENTIFICATION

Product code 12nc : 1322 534 33801
Supplier : RHENUS LUB GMBH & CO KG
Tradename : RHENUS NORLITH STM 2
General description : BALL BEARING GREASE
Appearance : paste - brown - specific

USAGELABEL

not applicable

FIRST AID

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.

PRECAUTIONARY MEASURES



polyvinyl alcohol gloves



safety goggles

Skin : none (when used normally)
Local exhausting : Under normal circumstances not applicable.
Spillage procedure : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.
Emergency procedure : not applicable
Fire-extinguisher : carbon dioxide, extinguishing powder, foam, water spray
Unsuitable fire-extinguisher : not traceable
Reaction with water : no

* Point to alterations with regard to the previous version.
The information provided in this Instructioncard is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.



PHILIPS

MATERIAL SAFETY DATA SHEET

According EC 1907/2006 (REACH)

1. Identification of the substance/preparation

MSDS : 10137
Product code 12nc : 1322 524 42501
Supplier : NSK
Tradename : NSK GREASE NO.2
General description : GREASE
Use : Various
Publicationdate :
General information : dangerous.goods@philips.com
Emergency phonenumber : +31 (0)497-598315

2. Hazard identification

3. Composition/information on ingredients

Component	CAS-no	EC-no	Catalogue-no	Percentage(%)	EC-label
DISTILLATES (PETROLEUM), SOLVENT-REFINED	64741-88-4	265-090-8	649-454-00-7	≥23.0 - ≤25.0	Xn;R: 65
HEAVY PARAFFINIC (DMSO <3%)					
ETHYLHEXYL-SEBACATE, BIS(2-	122-62-3	204-558-8		≥53.0 - ≤59.0	
LITHIUM STEARATE	4485-12-5	224-772-5		≥17.0 - ≤19.0	
METHYLENEBIS[N-SEC-BUTYLANILINE], 4,4'-	5285-60-9	226-122-6		≥1.0 - ≤3.0	

4. First-aid measures

Skin : Remove residue substance as soon as possible from the skin (f.i. rinse with much water).
Ingestion : Let drink 1 or 2 glasses of water. In case of general disorders call for a doctor.
Inhalation : Not applicable.
Eyes : Rinse for a long time with much water. In case of eye-sight disturbances consult a doctor.
Remarks first aid : none

5. Fire fighting measures

Fire-extinguisher : carbon dioxide, extinguishing powder, water spray, alcohol resistant foam
Unsuitable fire-extinguisher : not traceable
Special fire-fighting equipment : In the event of fire, wear protective clothing and use breathing apparatus that is independent of the ambient air.
Hazardous decomposition products in fire : carbon monoxide, nitrous oxides, lithium oxide

6. Accidental release measures

Spillage procedure : Dependent on quantity spilt paste, one has the choice between: - remove with cleaning rag or paper, or - cover paste with Powersorb, sand, diatomite, vermiculite and suchlike. Shovel the material into plastic bag or other suitable packaging and remove to the central depot for hazardous waste.
Emergency procedure : not applicable

7. Handling and storage

Local exhausting : Under normal circumstances not applicable.
Storage conditions : Store product away from ignition sources.
Storage code (on behalf of PGS 15) : none

8. Exposure controls/personal protection

Exposure limits :

applicable to: The Netherlands (20 °C; 1013 mbar)
TWA(8 hours): 5 mg/m3

No TWA has been laid down.
No TWA has been laid down.
No TWA has been laid down.

DISTILLATES (PETROLEUM),
SOLVENT-REFINED HEAVY PARAFFINIC
(DMSO <3%)(as oil aerosol) (Statutory threshold limit value)
ETHYLHEXYL-SEBACATE, BIS(2-
LITHIUM STEARATE
METHYLENEBIS[N-SEC-BUTYLANILINE],
4,4'-

applicable to: Belgium (20 °C; 1013 mbar)
TWA(8 hours): 5 mg/m3

DISTILLATES (PETROLEUM),
SOLVENT-REFINED HEAVY PARAFFINIC
(DMSO <3%)(as oil aerosol)

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TWA(15 minutes): 10 mg/m3

DISTILLATES (PETROLEUM),
SOLVENT-REFINED HEAVY PARAFFINIC
(DMSO <3%)(as oil aerosol)**applicable to:** Germany (20 °C; 1013 mbar)

TWA(8 hours): 1000 mg/m3

DISTILLATES (PETROLEUM),
SOLVENT-REFINED HEAVY PARAFFINIC
(DMSO <3%)(carbonhydrogen mix, group
1)**applicable to:** United States of America (25 °C; 1013 mbar)

TWA(8 hours): 0.2 mg/m3

DISTILLATES (PETROLEUM),
SOLVENT-REFINED HEAVY PARAFFINIC
(DMSO <3%)(as mineral oil, inhalable dust)

C=Ceiling; S=Skin

Remarks exposure limits :

none

Odour threshold (20°C; 1013 mbar) :

not traceable

DNEL (Derived No Effect Level)

not traceable

PNEC (Predicted No Effect Concentration)

not traceable

Advised personal protection :

Hands	:	butyl rubber gloves
Eyes	:	safety goggles
Inhalation	:	none (when sufficient exhausting)
Skin	:	none (when used normally)

9. Physical and chemical properties

Physical state	:	paste
Colour	:	white
Odour	:	almost odourless
Vapor rate/range	:	not traceable
Boiling point/range	:	not traceable
Melting point/range	:	not traceable
Flash point/range	:	200 °C
Explosive limits	:	not traceable
Dust explosions possible in air	:	not applicable
Relative density	:	0.93000 (water=1) (20 °C)
Vapour pressure	:	not traceable
Solubility in water	:	none
Solubility in fat	:	not traceable
pH	:	not applicable
Viscosity	:	not traceable
Autoignition temperature	:	not traceable
Decomposition temperature	:	not traceable
Electrostatic charge	:	no

10. Stability and reactivity

Conditions to avoid	:	none
Reactions with water	:	no
Hazardous reactions with	:	oxidizing substances, strong acids
Hazardous decomposition products at heating	:	none

11. Toxicological information**Symptoms**

Skin	* local	:	The substance is prickling: redness.	
	* general	:	Probably no absorption worth mentioning.	
Ingestion	* local	:	The substance is prickling: sore throat.	
	* general	:	The substance may be absorbed after ingestion.	
Inhalation	* local	:	The substance is with atomising prickling: sore throat.	
	* general	:	The substance may be absorbed after inhalation.	
Eyes	local	:	The substance is prickling: redness.	
* Remarks symptoms			:	The substance has an effect on: the kidneys, the nervous system, the heart.

Toxicity :

LD-50: >2.0 g/kg (ORL-RAT), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)

Source : CONCAWE

LD-50: >2.0 g/kg (SKN-RBT), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)

Source : CONCAWE

LD-50: 12.8 g/kg (ORL-RAT), ETHYLHEXYL-SEBACATE, BIS(2-

LD-50: 15 g/kg (ORL-RAT), LITHIUM STEARATE

Ames test : not traceable

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12. Ecotoxicological information

Biological oxygen demand (5)	: not traceable		
Chemical oxygen demand	: not traceable		
Biological/chemical oxygen demand ratio	: not traceable		
Degradability	: degradable DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: CONCAWE
Biochemical factor	: not traceable		
Log Po/w	: ≥3.9 - ≤6 DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)	Source	: IUCLID
Henry Constant	: not traceable		

Ecotoxicity :			
LC-50: >1000 mg/l/96H (Fish), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)		Source	: CONCAWE
EC-50: >1000 mg/l/48H (Daphnia), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)		Source	: CONCAWE
IC-50: >1000 mg/l/72H (Algae), DISTILLATES (PETROLEUM), SOLVENT-REFINED HEAVY PARAFFINIC (DMSO <3%)		Source	: CONCAWE

Remarks on ecotoxicity : none

13. Disposal considerations

Remainder material or uncleaned empty packagings have to be incinerated in a proper installation or dumped on an approved landfill, in accordance with local and national legislation.

14. Transport information

Not subject to Transport-regulation Dangerous Substances

15. Regulatory information

EC-Label	: not applicable
Remarks on EC-labeling	: none

16. Other information

Remarks on MSDS : The component(s), as mentioned in section 3, are registered in the Toxic Substances Control Act Inventory (USA).

Overview relevant R-sentences from all components in section 3 :
65 Harmful: may cause lung damage if swallowed.

Date last update : 2007-03-01

* Point to alterations with regard to the previous version.
The information provided in this Material Safety Data Sheet is correct to the best of the knowledge, information and belief of Philips Electronics Nederland B.V. at the date of its printing.

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